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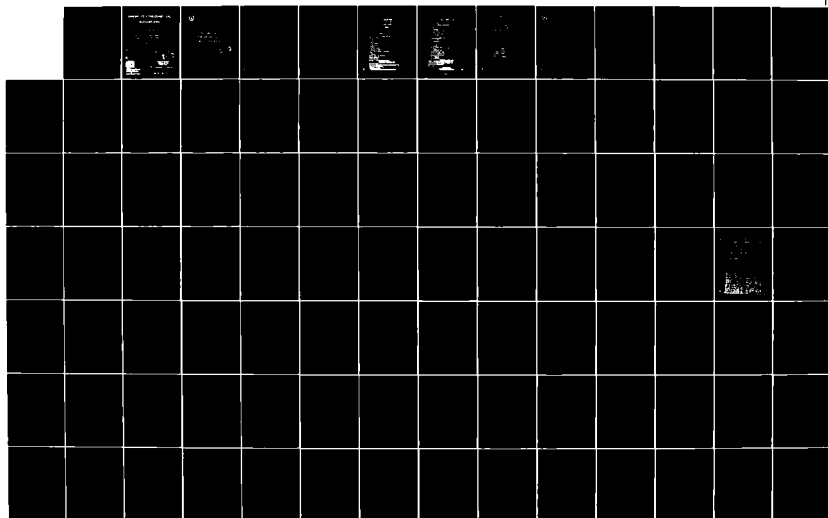
LOUISIANA STATE PENITENTIARY LEVEE MISSISSIPPI RIVER
MAIN REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT
AND APPENDIXES(U) ARMY ENGINEER DISTRICT NEW ORLEANS LA
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8.3 STATEMENT RECIPIENTS

8.3.1. FEDERAL

J. Bennett Johnston, US Senator

Russell B. Long, US Senator

W. Henson Moore, US Congressman

Gillis W. Long, US Congressman

US Department of the Interior, Assistant Secretary for Program Development and Budget, Office of Environmental Project Review

US Fish and Wildlife Service, Regional Director, Atlanta, Georgia

US Fish and Wildlife Service, Area Manager, Jackson, Mississippi

US Fish and Wildlife Service, Field Supervisor, Lafayette, Louisiana

Environmental Protection Agency, Regional Administrator, Region VI

Environmental Protection Agency, Administrator, Washington, DC

US Department of Commerce, Deputy Assistant Secretary for Environmental Affairs

US Department of Commerce, National Oceanic and Atmospheric Administration, Office of Ecology and Conservation

US Department of Commerce, Director, National Oceanic and Atmospheric Administration, National Ocean Survey

US Department of Commerce, Meteorologist in Charge, National Weather Service, New Orleans Area

US Department of Commerce, Regional Director, National Marine Fisheries Service

US Department of Commerce, Area Supervisor, National Marine Fisheries Service, Water Resources Division

US Department of Agriculture, Regional Forester, Forest Service

US Department of Agriculture, State Conservationist, Soil Conservation Service

FEDERAL (Continued)

US Department of Agriculture, Regional Forester, Forest Service

US Department of Agriculture, State Conservationist, Soil Conservation Service

US Department of Transportation, Division Engineer, Federal Highway Administration

US Department of Transportation, Commander, Eighth Coast Guard District

US Department of Health and Human Services, Public Health Service, Centers for Disease Control

US Department of Health and Human Services, Regional Director, Public Health Service, Region VI

US Department of Health and Human Services, Water Resources Activity, Vector Biology and Control Division

Federal Energy Administration, Director, Environmental Impact Division, Office of Environmental Programs

Federal Power Commission, Acting Advisor on Environmental Quality, Washington, DC

Federal Maritime Commission, Office of Environmental Analysis

US Department of Housing and Urban Development, Regional Administrator, Region VI, Fort Worth, Texas

US Department of Housing and Urban Development Area Office, Director, New Orleans, Louisiana

Advisory Council on Historic Preservation

8.3.2. STATE

Central Regional Clearinghouse, Alexandria, Louisiana

Louisiana Department of Health and Human Resources, Office of Health and Environmental Quality

Louisiana Department of Transportation and Development, Office of Public Works

Office of Intergovernmental Relations, Office of Governor

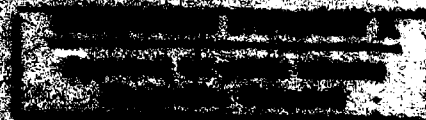
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LOUISIANA STATE PENITENTIARY LEVEL, MISSISSIPPI RIVER

MAIN REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT AND APPENDIXES

JANUARY 1982

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FINAL ENVIRONMENTAL REPORT

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STATE (Continued)

Louisiana Department of Wildlife and Fisheries Game Division, Chief

Louisiana Department of Wildlife and Fisheries Fish Division, Chief

Louisiana Department of Wildlife and Fisheries Coordinator,
Environmental Section

Louisiana Department of Wildlife and Fisheries, Baton Rouge District
Office No. 7

Louisiana State Parks and Recreation Commission

Louisiana Archaeological Survey and Antiquities Commission, State
Archaeologist

Louisiana Office of Environmental Affairs

Louisiana Coastal Commission

Louisiana Public Service Commission

Louisiana Department of Natural Resources, Office of Forestry

Louisiana Department of Natural Resources, Office of Conservation

Louisiana Department of Natural Resources, Office of Environmental
Affairs, Water Pollution Control Division

Louisiana Department of Commerce and Industry

Louisiana Department of Culture, Recreation, and Tourism, State
Historic Preservation Officer

Louisiana Assistant Attorney General

Louisiana Department of Justice, Environmental Section

Louisiana Joint Legislative Committee on Environmental Quality,
Louisiana Legislature

Louisiana State Land Office Register

Louisiana State Planning Office

Louisiana State Soil and Water Conservation Committee

Louisiana State University, Associate Director, Sea Grant Program,
Center for Wetland Resources

Louisiana State University, Coastal Studies Institute



DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P. O. BOX 60267
NEW ORLEANS, LOUISIANA 70160

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LOUISIANA STATE PENITENTIARY LEVEE, MISSISSIPPI RIVER

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APR 7 1983
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DISTRIBUTION STATEMENT A

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STATE (Continued)

Louisiana Department of Culture, Recreation, and Tourism, State
Historic Preservation Officer

Louisiana Assistant Attorney General

Louisiana Department of Justice, Environmental Section

Louisiana Joint Legislative Committee on Environmental Quality,
Louisiana Legislature

Louisiana State Land Office Register

Louisiana State Planning Office

Louisiana State Soil and Water Conservation Committee

Louisiana State University, Associate Director, Sea Grant Program,
Center for Wetland Resources

Louisiana State University, Coastal Studies Institute

Louisiana State University, Cooperative Wildlife Research Unit

Louisiana State University, Curator of Anthropology, Department of
Geography and Anthropology

University of New Orleans, Coordinator, Environmental Impact
Section, Department of Environmental Affairs

University of New Orleans, Department of Anthropology and Geography

Office of Emergency Preparedness

8.3.3. CITIZENS GROUPS (National and Local)

Ecology Center of Louisiana, Inc.

Orleans Audubon Society, c/o Mr. Barry Kohl

National Audubon Society, Library

National Audubon Society, Southwestern Regional Office, Regional
Representative

National Audubon Society, Field Research Director

National Audubon Society, Director of Audubon Sanctuaries

SYLLABUS

The purpose and primary objective of this study is to review the report on the Mississippi River and Tributaries project, and other pertinent reports, with a view to determining whether incorporating the local levee at the Louisiana State Penitentiary into the Federal levee system is advisable.

Investigations during this study identified and analyzed, in addition to the alternative of "no-action," both nonstructural and structural alternatives for providing increased flood protection. They showed that feasible nonstructural measures were already part of the without-project condition and that only one of the preliminary structural alternatives (plan A) was economically justified. Plan A provides for raising and strengthening the existing mainline levee to provide protection from the Project Design Flood. This plan was carried into the detailed study stage.

In the detailed study process, plan A was reanalyzed to determine if its potential adverse environmental impacts could be further minimized. A modified plan, plan A1, was developed. This plan is identical to plan A except that construction methods would be modified to avoid valuable wildlife habitat in locating new borrow pits. Plan A1 was designated as the least environmentally damaging plan in the detailed study process.

Both plans A and A1 would provide approximately \$500,000 average annual excess benefits over costs while plan A1's environmental impacts would be less than plan A. From an overall standpoint, the minor increase in cost associated with plan A1 is small when compared to the greater adverse environmental impacts that would accompany plan A. Therefore, plan A1 is selected for recommendation.



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CITIZENS GROUPS (National and Local) (Continued)

National Sierra Club, Thibodaux
Chappeeela Group Sierra Club (Florida Parishes), Hammond
National Wildlife Federation, Washington, DC
National Wildlife Federation, New Orleans, LA
Louisiana Wildlife Federation, Baton Rouge, LA
Louisiana Wildlife Federation, Water Control Projects Committee,
Chairman, New Iberia, LA
Wildlife Management Institute, Washington, DC
Wildlife Management Institute, South-Central Field Representative
The Conservation Foundation
Environmental Defense Fund
National Resources Defense Council
Environmental Information Center, Inc.
Trout Unlimited, San Antonio, Texas
Louisiana Environmental Professionals Association
South Louisiana Environmental Council, Houma, LA
The Fund for Animals, Inc., Field Agent

8.3.4 OTHERS

Capital Region Planning Commission
Florida Regional Clearinghouse
West Feliciana Parish Police Jury
New Orleans Public Service, Inc., New Orleans, LA
Mid-South Utilities, New Orleans, LA
Steimler and Associates, Metairie, LA
T. Baker Smith and Son, Inc., Houma, LA

8.4 STATEMENT COMMENTATORS

FEDERAL

Department of Agriculture
Soil Conservation Service
Alexandria, LA

Department of Commerce
Director of Regulatory Policy
Washington, DC

Department of Commerce
National Oceanic and Atmospheric
Administration
National Ocean Survey
Rockville, MD

Department of Health and Human
Services
Public Health Service
Centers for Disease Control
Atlanta, GA

Department of Housing and Urban
Development
Fort Worth Regional Office

Department of the Interior
Office of the Secretary
Southwest Region

Department of Transportation
Federal Highway Administration
Baton Rouge, LA

Environmental Protection Agency
Region VI

STATE

Department of Culture, Recreation
and Tourism
Office of Program Development
State Historic Preservation Officer

Department of Transportation and
Development
Office of Public Works

Department of Wildlife and Fisheries
New Orleans, LA

ORGANIZATIONS

Capital-Area Groundwater Conservation
Commission

Wildlife Management Institute

8.5 PUBLIC VIEWS AND RESPONSES

8.5.1. The views expressed to this agency which had a major influence on the decision-making process were the need for flood protection for the penitentiary and the concern for avoiding environmental degradation. These views resulted in the elimination of preliminary plans and the eventual development of the detailed plans described in this report.

8.5.2. The comments received from all agencies and organizations to the draft report and EIS and the respective responses are displayed in Appendix G.

8.5.3. The US Department of Health and Human Services, Center for Disease Control expressed concern, primarily, that existing or potential mosquito or other vector populations and associated needs were not addressed. A listing of the most common mosquito vectors inhibiting the study area and impacts are provided within the sections on Water Bodies and Associated Wetlands in the EIS. Vector control will be emphasized in the advanced engineering and design report indicating the responsibility and methods by which vector problems would be minimized.

8.5.4. The US Department of the Interior commented that the Corps of Engineers should utilize professionals in archeology, architecture, and history when conducting the proposed cultural resources survey and also must request determinations of eligibility for the National Register on each site and structure identified in that survey. The proposed survey will be conducted utilizing professionals of all appropriate disciplines. The survey results will be coordinated with the Louisiana State Historic Preservation Officer, whose opinion regarding significance will be requested. Formal requests for determinations of eligibility will be made for those sites which meet National Register criteria (36 CFR 60.4) of significance.

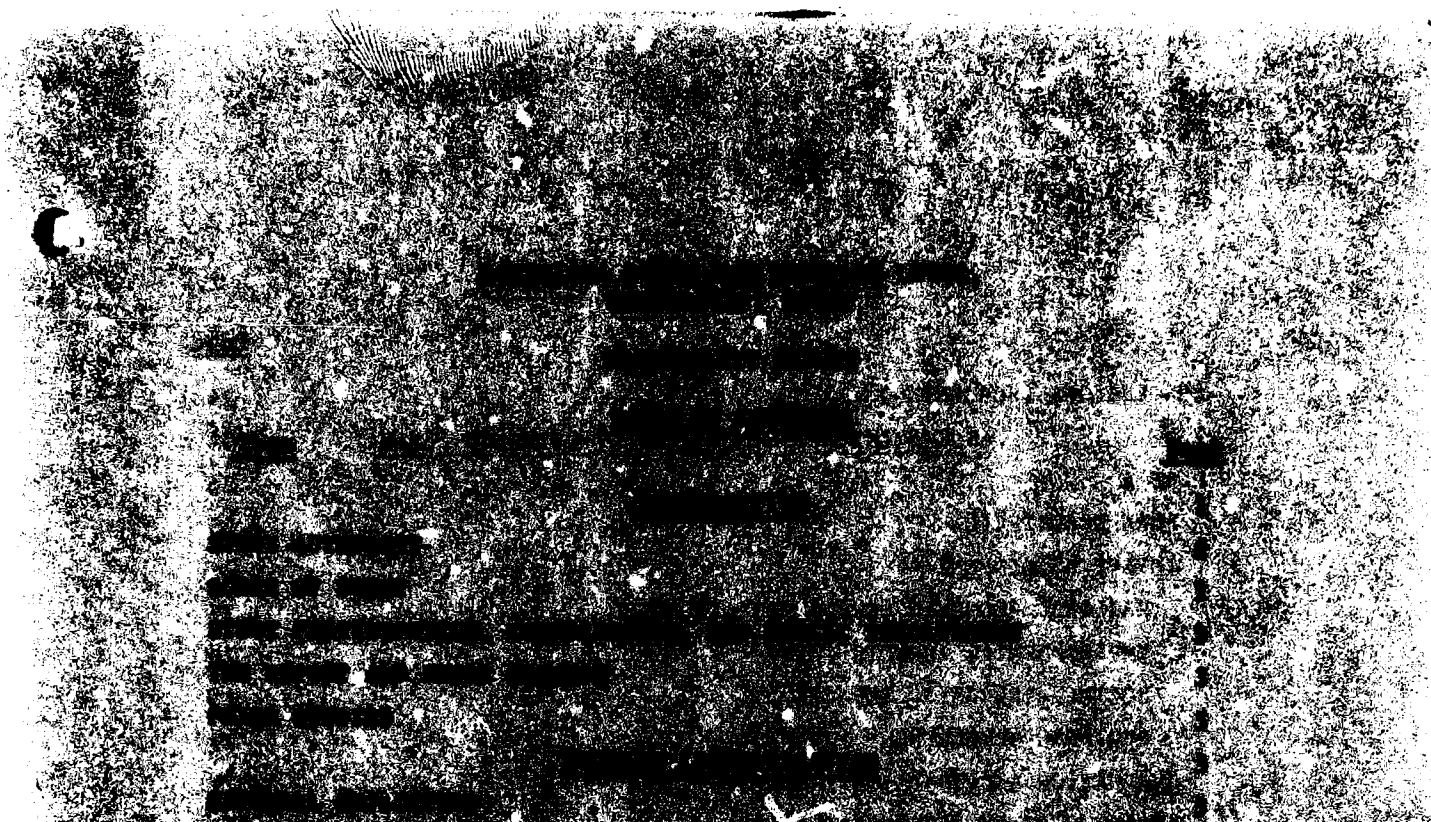
8.5.5 The Wildlife Management Institute comments addressed, primarily, the increased costs of Plan A1 over Plan A. They recommended that these

1 funds be utilized to purchase a larger acreage of bottomland hardwoods adjacent to one of the existing Louisiana Department of Wildlife and Fisheries wildlife management areas, with these lands being turned over to that agency for management. The increased costs of Plan A1 over Plan A result from the expense of minimizing environmental damage within the study area. The loss of 74 acres of bottomland hardwoods which would occur with Plan A can be avoided. Plan A would result in the certain destruction of these resources and would constitute a net loss of this habitat. The term net loss is used because only creation of an additional 74 acres of bottomland hardwoods would replace the acres lost, in the strictest sense. Although we appreciate the position of the Wildlife Management Institute concerning public use, it is the opinion of this agency that the bottomland hardwoods that would be destroyed with Plan A have an inherent ecological value to the specific study area which could not be compensated for by land acquisition elsewhere.

TABLE 9 - INDEX, REFERENCES, AND APPENDICES

STUDY DOCUMENTATION

Subject	Environmental Impact Statement	Main Report (References Incorporated)	Report Appendixes (References Incorporated)
Affected environment	pp. EIS-17-24, para 5	pp. 6-10	App. A, pp. A-2-7; App. D, Sec. I, II, & III;
Alternatives	pp. EIS-11-16, para 4	pp. 15-43	App. B
Areas of controversy	p. EIS-4, para 1.2	--	--
Comparative impacts of alternatives	pp. EIS-16, para 4.4	pp. 37-42	App. B, pp. B-26-28
Cover sheet	p. EIS-1	--	--
Environmental conditions	pp. EIS-17-18, para 5.1	pp. 6-10	App. A, pp. A-2-7 App. D, Sec. I, II, & III
Environmental effects	pp. EIS-25-32, para 6	pp. 31-33	App. B, pp. B-20-22; App. D, Sec. I & II
Index, references, and appendixes	pp. EIS-44-46, para 9	--	--
List of Preparers	pp. EIS-33-34, para 7	--	--
Major conclusions and findings	pp. EIS-3-4, para 1.1	pp. 35	App. B, pp. B-24-25
Need for and objectives of study	pp. EIS-9-10, para 3	pp. 5-6	App. A, pp. A-10-11
Nonstructural alternative	pp. EIS-13, para 4.2.2	pp. 16-17	App. B, pp. B-3-4
Planning objectives	p. EIS-10, para 3.3	p. 14	App. A, p. A-13
Plans considered in detail	pp. EIS-13-15, para 4.3	pp. 24-43	App. B, pp. B-11-29
Plans eliminated from further study	pp. EIS-11-12, para 4.1	pp. 17-24	App. B, pp. B-4-11



Subject	Environmental Impact Statement	Main Report (References Incorporated)	Report Appendices (References Incorporated)
Plan implementation and responsibility	pp. EIS-15, para 4.3.3	pp. 34, 41-42	App. B, pp. B-18, 23
Public concerns	pp. EIS-9-10, para 3.2	pp. 13	App. A, pp. A-10-11
Public involvement	pp. EIS-35-43, para 8	pp. 3	--
Public involvement program	p. EIS-35, para 8.1	pp. 3	--
Public views and responses	p. EIS-42-43, para 8.5	--	--
Relationship of plans to environmental protection statutes and other environ- mental requirements	pp. EIS-5-7, para 1.4	--	--
Required coordination	pp. EIS-35, para 8.2	--	--
Significant resources	pp. EIS-18-24, para 5.2	pp. 6-10, 25-29, 31-33	App. A, pp. A-2-7; App. B, pp. B-13-17; 20-22 App. D, Sec I, II, & III
Agricultural lands	pp. EIS-16, 21, 25, para 4.4, 5.2.1, 6.2	pp. 9-10	App. A, pp. A-6-7
Audubon Society Blue List	pp. EIS-16, 23-24, 31-32, para 4.4, 5.2.9, 6.10	p. 32	App. B, p. B-21
Bottomland hardwoods and associated forests	pp. EIS-16, 20-21, 27-28 para 4.4, 5.2.5, 6.6	pp. 31-32	App. B, pp. B-14, 20 App. D, Sec II
Fishery resources	pp. EIS-16, 22, 29-30, para 4.4, 5.2.7, 6.8	p. 32	App. B, pp. B-20-21; App. D, Sec II
National Register of Historic Places	pp. EIS-16, 19, 26, para 4.4, 5.2.3, 6.4	pp. 28,	App. B, p. B-16; App. D, Sec III
Prison facilities	pp. EIS-16, 18-19, 25-26, para 4.4, 5.2.2, 6.3	pp. 9-10	App. E, pp. E-3-5

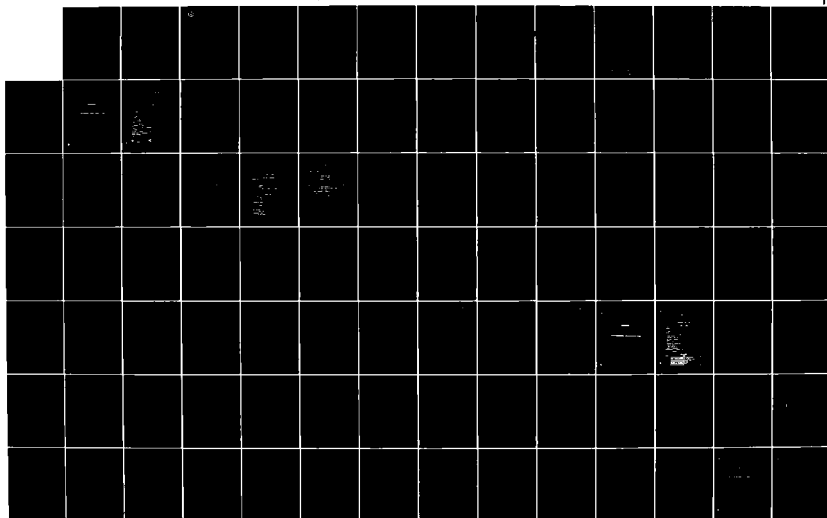
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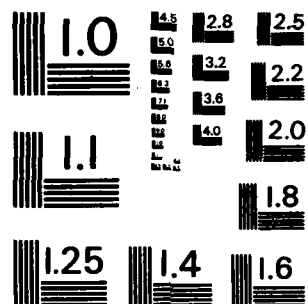
LOUISIANA STATE PENITENTIARY LEVEE MISSISSIPPI RIVER
MAIN REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT
AND APPENDIXES(I) ARMY ENGINEER DISTRICT NEW ORLEANS LA
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NATIONAL BUREAU OF STANDARDS-1963-A

Subject	Environmental Impact Statement	Main Report (References Incorporated)	Report Appendices (References Incorporated)
Threatened and endangered species	pp. EIS-16, 22-23, 30, para 4.4, 5.2.8, 6.9	pp. 32	App. B, pp. B-15, 21; App. D, Sec I & II
Waters bodies and associated wetlands	pp. EIS-16, 19-20, 26-27, para 4.4, 5.2.4, 6.5	pp. 26, 31	App. B, pp. B-13-14, 20
Wildlife resources	pp. EIS-16, 21-22, 28-29, para 4.4, 5.2.6, 6.7	pp. 27, 32	App. B, pp. B-15, 21; App. D, Sec I & II
Statement commentators	p. EIS-41, para 8.4	--	--
Statement recipients	pp. EIS-36-40, para 8.3	--	--
Study authority	p. EIS-9, para 3.1	p. 2	App. A, p. A-1
Summary	pp. EIS-3-4, para 1	pp. 34-35	--
Table of contents	p. EIS-8, para 2	--	--
Unresolved issues	p. EIS-4, para 1.3	--	--
Without conditions	p. EIS-13, para 4.2	p. 14-15	App. A, p. A-10





DEPARTMENT OF THE ARMY
MISSISSIPPI RIVER COMMISSION, CORPS OF ENGINEERS
VICKSBURG, MISSISSIPPI 39180

ADDRESS REPLY TO:

PRESIDENT, MISSISSIPPI RIVER COMMISSION
CORPS OF ENGINEERS
P. O. BOX 60
VICKSBURG, MISSISSIPPI 39180

MRCPD-F

SUBJECT: Louisiana State Penitentiary Levee, Mississippi River (12087)

Commander
US Army Corps of Engineers
Washington, D. C. 20314

Summary of Commission Action

The Commission finds that improvements for flood protection at the Louisiana State Penitentiary at Angola are needed, economically justified and socially and environmentally acceptable. The Commission concurs in District Commander's plan for raising and strengthening about 12.1 miles of existing locally built mainline levee and incorporating it into the Federal levee system, replacing two existing 6- by 6-foot concrete culverts with two new 6- by 6-foot concrete culverts with sliding vertical sluice gates, and modifying discharge pipes for existing 120,000 gpm pumps to pass over the new levee. Total construction cost is estimated at \$21,100,000 (October 1981 price level). The benefit-cost ratio is 1.3.

Summary of Report Under Review

1. Authority. The Louisiana State Penitentiary Levee, Mississippi River study was authorized by a resolution adopted by the Committee on Public Works of the United States Senate on 5 September 1973. The resolution, requested by Senator Russell B. Long of Louisiana, is quoted as follows:

"RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Chief of Engineers, Department of the Army, is hereby requested to review the report on the Mississippi River and Tributaries Project, published as House Document 308 of the Eighty-eighth Congress, and other pertinent reports, with a view to determining whether incorporating the local levee at the Louisiana State Penitentiary into the Federal levee system is advisable."

2. District Commander's Report. The final Feasibility Report of the District Commander, U. S. Army Engineer District, New Orleans, which presents the

MRCPD-F

SUBJECT: Louisiana State Penitentiary Levee, Mississippi River (12087)

results of studies of flood control problems at the Louisiana State Penitentiary at Angola, is inclosed (Incl 1).

3. Description of Study Area. The Louisiana State Penitentiary Levee study area is located on the left descending bank of the Mississippi River between river miles 294 and 310 above Head of Passes, in West Feliciana Parish about 50 miles northwest of Baton Rouge. The State Penitentiary comprises 19,428 acres of which approximately 16,240 acres are subject to potential Mississippi River overflow, the remainder being in the Tunica Hills above the Alluvial Plain. A locally constructed levee system provides partial protection to about 12,140 acres. The mainline levee provides about 30-year protection to 9,866 acres. The Monkey Island and Charity Lake levees provide a lesser degree of protection to 858 acres and 1,416 acres, respectively.

4. Economic Development. Within the mainline levee, about 4,850 acres are used for pastureland and 4,390 acres are used for cropland, with a net annual return of about \$859,000 (1980 price levels). The area within the Monkey Island and Charity Lake levees is used for cropland and pastureland with net annual returns of \$60,000 and \$7,000, respectively. As of 1976, the penitentiary buildings included 15 dormitories, mess hall, workshops, a hospital, and other support activities with a value of \$46,757,000 (1980 price levels) with additional facilities completed between 1976 and 1980 with a value of \$88,680,000. On-going work raises the total value of improvements at the penitentiary to \$141,677,000.

5. Existing Improvements.

a. Corps of Engineers. There are no existing Federal flood control improvements at the Louisiana State Penitentiary but several nearby features of the MR&T project affect the penitentiary and help reduce flood stages in the Mississippi River adjacent to the penitentiary. The Old River low sill and overbank structures, about 5 miles upstream, are designed to divert combined flood flows of up to approximately 630,000 cfs. The Morganza Control Structure, about 14 miles downstream, is capable of diverting about 600,000 cfs. These structures direct a substantial part of Mississippi River flood flows into the Atchafalaya Basin thereby reducing flood flows and stages on the river. The Old River Navigation Lock, located opposite the penitentiary at river mile 303, provides continued navigation between the Atchafalaya, Ouachita, Black and Red Rivers and the Mississippi River.

b. Non-Federal. The Department of Corrections of the Louisiana Department of Health and Human Resources owns the present levee system surrounding the penitentiary. The levee system was built primarily by inmate labor and not to grade or section specifications required for the Federal levee system. The local levee system consists of three levees: the main line levee which is 12.1 miles long and provides approximately 30-year protection to 9,866 acres; the Monkey Island levee, 2.9 miles long, provides approximately 3-year protection to 858 acres; and the Charity Lake levee, 4.7 miles long, which provides approximately 6-year protection to 1,416 acres. A two 6- by 6-foot concrete culvert gravity drainage structure and three electrical pumps with a total pumping capacity of 120,000 gallons

MRCPD-F

SUBJECT: Louisiana State Penitentiary Levee, Mississippi River (12087)

per minute are included for interior drainage. Water is pumped over the levee through two 36-inch diameter cast iron pipes.

6. Problems and Needs. The existing levee is deficient in both grade and cross-section. These deficiencies make failure a possibility during high-water season. It is estimated that a 30-year flood would be sufficient to cause failure. In the event of failure or the threat of failure, evacuation of the inmate population would be necessary. A stage of 60 feet NGVD (about 20-year flood) necessitates significant flood-fight efforts and with a forecast of a continued rising crest could result in an emergency evacuation. Finding an alternative location for housing and confining the prisoners would pose a formidable problem. The area also has seepage and interior drainage problems which can be detrimental to the crops inside the levee system during high water.

7. Improvements Desired. Local interests have asked that the local levee be incorporated in the Federal levee system, the maximum justifiable land area be protected, adequate interior drainage facilities be provided, and an access road between the ferry landing and the penitentiary be constructed.

8. Alternatives Considered. Structural alternatives considered included levees and floodwalls along existing levee alignments and along the Mississippi River's east bank to encompass the entire study area; construction of ring levees to increase protection of existing facilities; elevating or restricting future development to higher ground; and increasing pumping capacity to provide drainage relief. Non-structural alternatives considered included relocation of facilities subject to flood damage, flood proofing, flood-forecasting and evacuation plans, flood-fighting, and land-use measures.

9. Recommended Plan. The recommended plan consists of raising and strengthening the mainline levee to a maximum elevation of 71.5 feet NGVD with seepage berms where necessary. The levee would have a 10-foot crown with side slopes of 1 vertical on 5.5 horizontal on the land side and 1 vertical on 4 horizontal on the riverside. This would provide protection from the Project Design Flood with 4 feet of freeboard. The existing gravity drainage culverts would be replaced by two 6- by 6-foot concrete culverts with sliding vertical sluice gates. The pump discharge pipes would be modified to pass over the levee. No change in the pumps is contemplated. Any future modification of the pumps or pumping capacity would be a responsibility of local interests.

10. Economic Evaluation. Based on October 1981 price levels, the District Commander estimates the first cost of the recommended project to be \$21,100,000 of which, under conventional cost sharing for the MR&T Project, \$19,941,000 would be Federal and \$1,159,000 would be non-Federal. The annual charges, based on an interest rate of 7-5/8 percent and a 100-year period for economic analysis, are estimated at \$1,814,000 including operation and maintenance costs of \$15,000 annually. Average annual benefits from flood damage prevention are estimated at \$2,298,000, and the benefit-cost ratio is 1.3.

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SECRET

This image shows a highly textured, grainy surface, likely a scan of a physical document or a wall. A prominent vertical crease or fold line runs down the center of the image. The surface is covered in a dense pattern of small white specks and dark patches, giving it a mottled appearance. The lighting is very bright, creating a stark contrast between the dark and light areas. There is no discernible text or other graphical elements.

MRCPD-F

SUBJECT: Louisiana State Penitentiary Levee, Mississippi River (12087)

11. Project Effects. The recommended plan would have both beneficial and adverse impacts. Flood protection to agriculture and improvements would be increased reducing the likelihood of inmate evacuation and subsistence and hence the tremendous economic and social upheaval associated with evacuation. Approximately 5 acres of bottomland hardwoods, 1 acre of waterbodies and associated wetland and 345 acres of open land would be affected by levee construction and borrow pit excavation and about 345 acres of aquatic habitat would be created. The plan would have beneficial impacts to endangered species within the study area by creating open, deep-water areas providing suitable breeding habitat for the American alligator.

12. Recommendations of the Reporting Officer. The District Commander recommends incorporation of the mainline levee into the Federal levee system in accordance with the plan described in his report, subject to cost-sharing and financing arrangements which are satisfactory to the President and Congress.

13. Response to Public Notice. The New Orleans District Commander issued a public notice on 28 January 1982 stating his findings and recommendations and inviting public comment to the Mississippi River Commission. There were no responses.

Review of the Mississippi River Commission

14. General. The scope of the Commission's review encompassed the overall technical, economic and environmental aspects of the recommended plan. The report's conformance to the 14 December 1979 Water Resources Council's Principles and Standards was considered as well as the views of State and Federal agencies and local interests.

15. Findings and Conclusions. The Mississippi River Commission concurs in general with the findings and recommendations of the District Commander. The recommended plan is engineeringly and environmentally acceptable and economically justified. Total project first costs are estimated at \$21,100,000 based on October 1981 price levels. Average annual charges, based on the current interest rate of 7-5/8 percent and a 100-year period for economic analysis, are estimated at \$1,814,000. Average annual benefits are estimated at \$2,298,000, and the benefit-cost ratio is 1.3. Under traditional cost-sharing required by the 1928 Flood Control Act, non-Federal project responsibilities include: perform normal maintenance, accept any lands turned over to them, and provide without cost to the United States all rights-of-way for levee foundations and levees. The present administration is reviewing cost-sharing policy, but specific percentages regarding cost-sharing and financing have not been determined. The District Commander recommends construction subject to cost-sharing and financing arrangements, which are satisfactory to the President and the Congress. The Commission notes that implementation of the recommended plan could affect the Project Design Flood flowline by up to approximately 0.2 feet. This is not considered a significant impact that would necessitate an increase in levee grades opposite the recommended project. This matter will be investigated further during post-authorization detailed planning. The Commission also notes that the

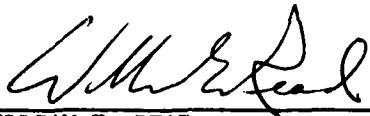
MRCPD-F


SUBJECT: Louisiana State Penitentiary Levee, Mississippi River (12087)

difference between the NED and LED (recommended) plans is limited to the location of borrow areas for levee construction and is conceptual in nature. The precise location of borrow areas is more appropriate for determination during post-authorization detailed planning. The Commission believes that no Federal funds should be expended for the preservation of environmental value unless the state provides assurances that these lands will be protected for that purpose. The Commission believes that the plan recommended by the District Commander will provide suitable flood protection to the Louisiana State Penitentiary and eliminate adverse social effects associated with prisoner evacuation and relocation. The Commission also believes that the recommended project is a proper added increment to the Mississippi River and Tributaries Project authorized by the Flood Control Act approved 15 May 1928, as amended.

16. Recommendations. The Mississippi River Commission recommends that the existing project, Mississippi River and Tributaries, authorized by the Flood Control Act approved 15 May 1928, as amended, be further modified to provide for flood control improvements at the Louisiana State Penitentiary, Mississippi River, generally in accordance with the plans of the reporting officer, with such modifications as in the discretion of the Chief of Engineers may be advisable, subject to cost-sharing and financing arrangements with the responsible non-Federal agencies sponsoring the project which are satisfactory to the President and the Congress.


1 Incl
NOD Rpt



WILLIAM E. READ
Major General, USA
President, Mississippi River Commission


ROY T. SEASSUMS
Member


SAM E. ANGEL
Member


R. D. JAMES
Member


HUGH G. ROBINSON
Major General, USA
Member


R. S. KEM
Brigadier General, USA
Member



DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P. O. BOX 60267
NEW ORLEANS, LOUISIANA 70160

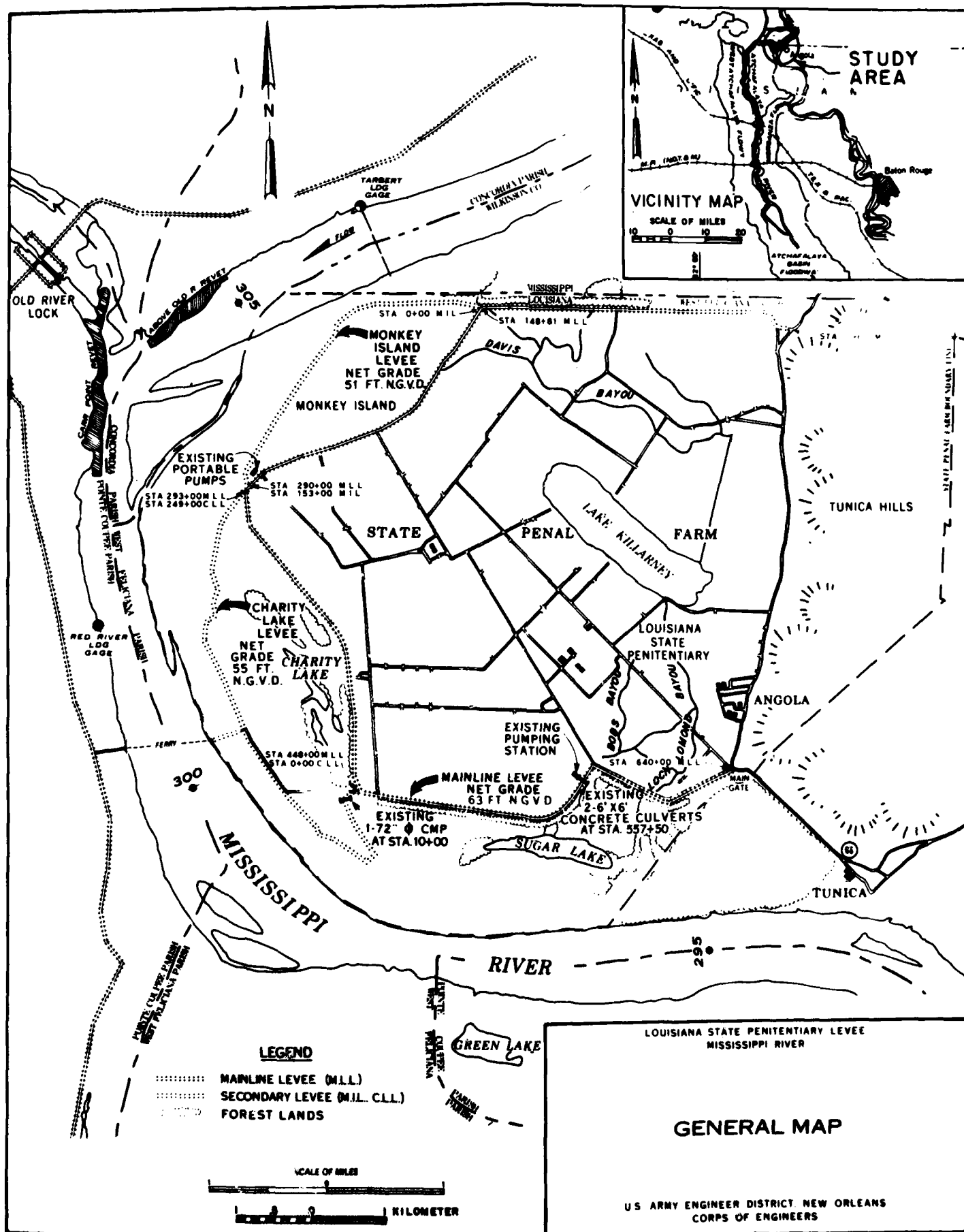
LOUISIANA STATE PENITENTIARY LEVEE, MISSISSIPPI RIVER

FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

INTRODUCTION

The study area, as shown on plate 1, is located in southeastern Louisiana. It consists of the Louisiana State penal farm at Angola which occupies 19,428 acres on the left descending bank of the Mississippi River in West Feliciana Parish about 50 miles northwest of Baton Rouge, between Mississippi River miles 294 and 310 above Head of Passes (AHP). The adjacent 16-mile reach of the Mississippi River is also considered a part of the study area. The prison compound is encircled by approximately 12.1 miles of locally built mainline levee which abuts the Tunica Hills on the east. The levee provides the major existing flood protection for about 9,866 acres of the Angola State penal facilities. Monkey Island levee, which abuts the mainline levee and is approximately 2.9 miles long, is located on the northwestern corner of the study area and provides secondary protection to about 858 acres of farmlands. Charity Lake levee, which also abuts the mainline levee and is approximately 4.7 miles long, is located on the southwestern portion of the study area and provides secondary protection to about 1,416 acres of pasturelands. In addition, 4,101 unprotected acres are located outside of the levee system and the remaining 3,187 acres lie in the Tunica Hills above the flood-prone area.

The present Angola levee system, which is substandard with regards to Federal specifications, is one of the few mainline systems in the Lower Mississippi Valley which is not under Federal control and



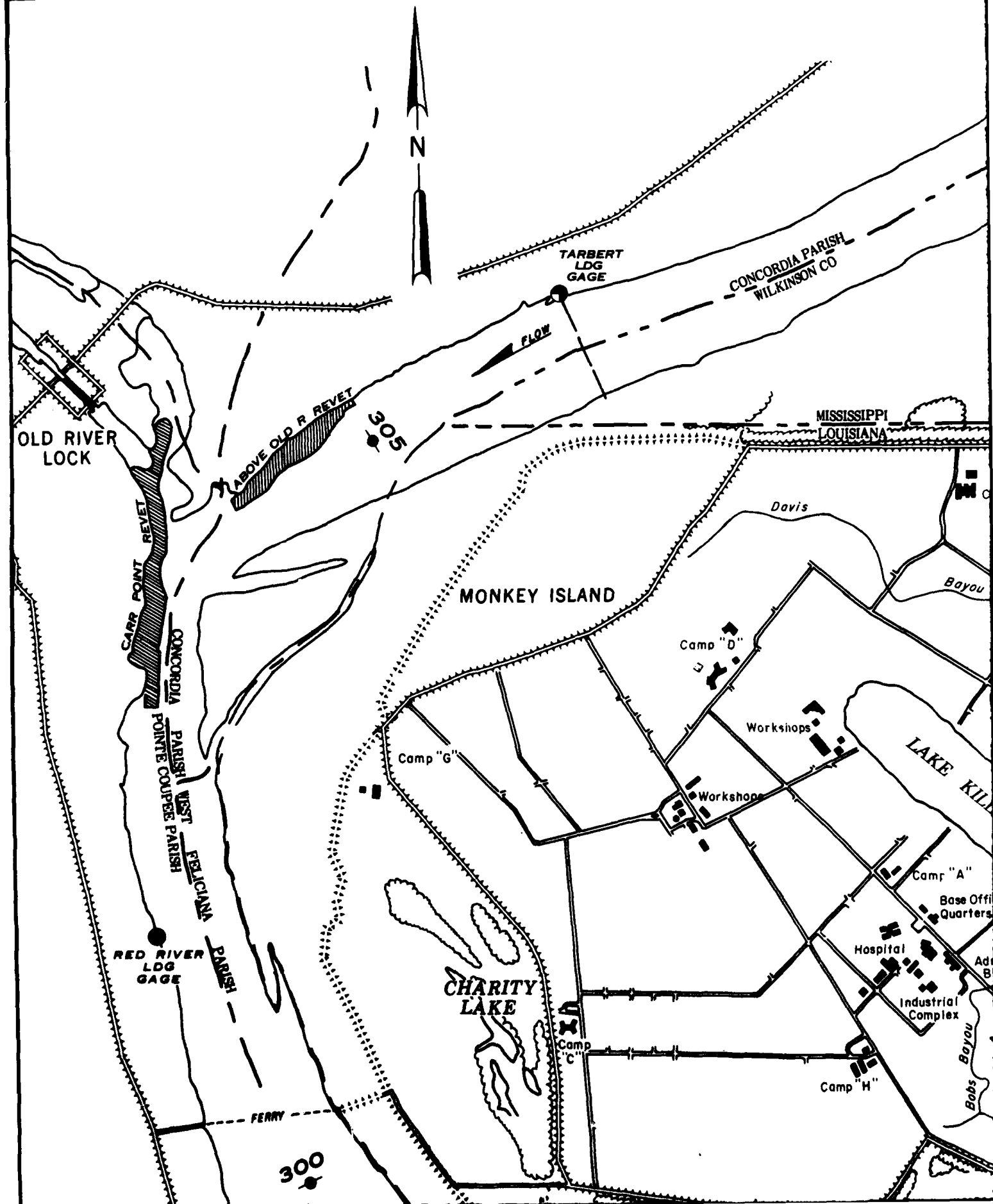
STUDY PARTICIPATION, COORDINATION, AND PUBLIC INVOLVEMENT

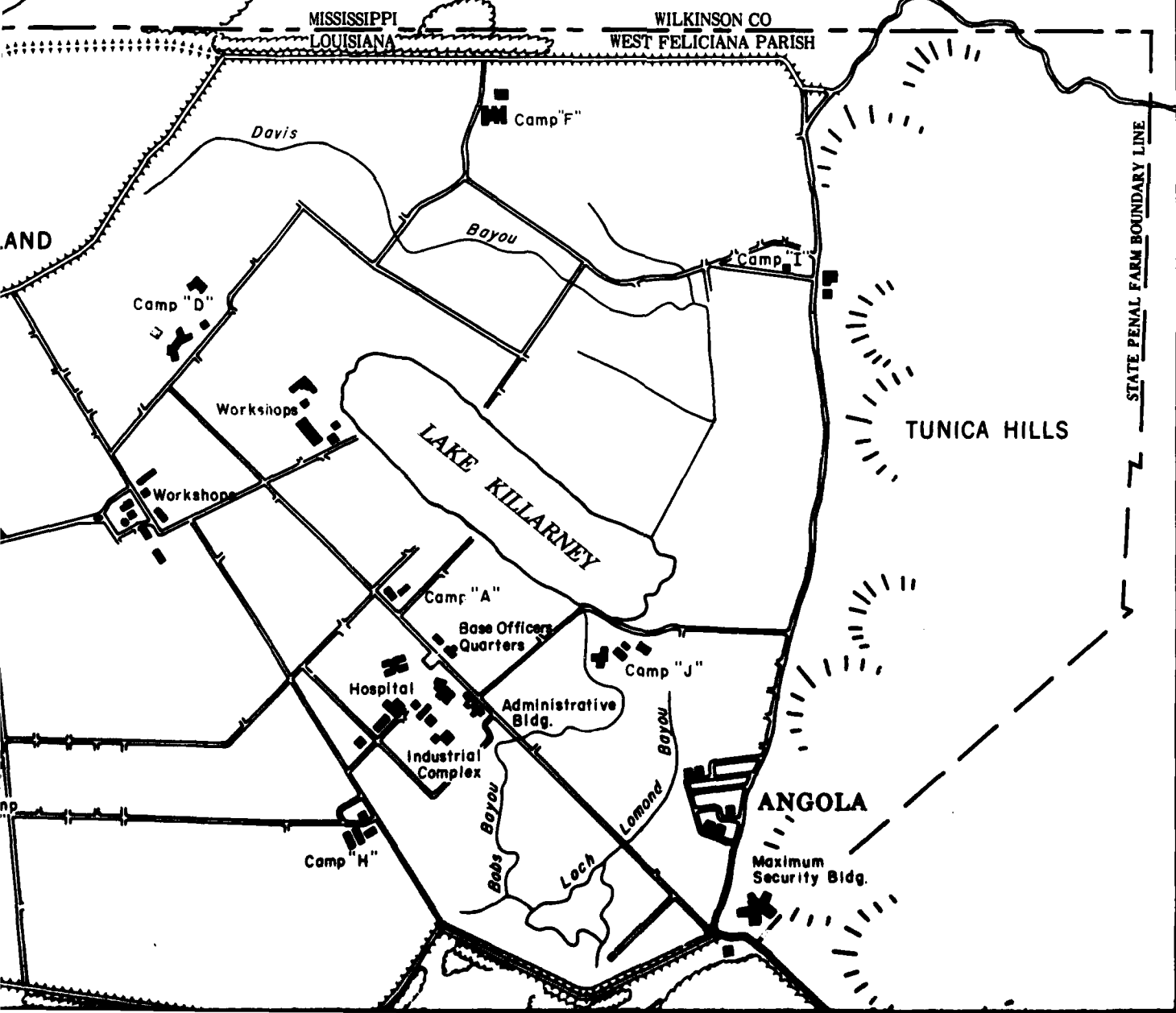
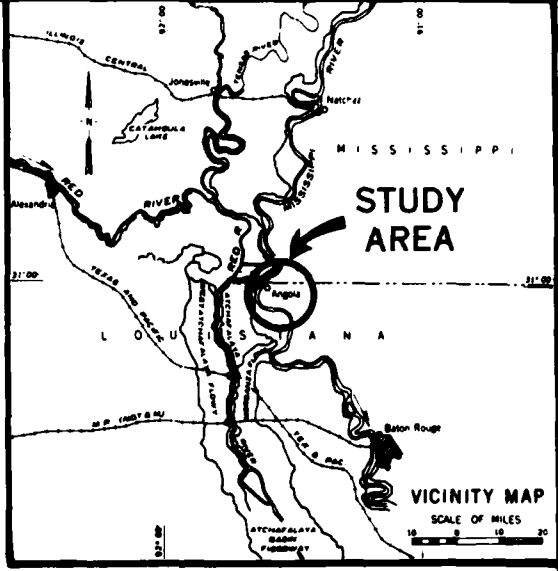
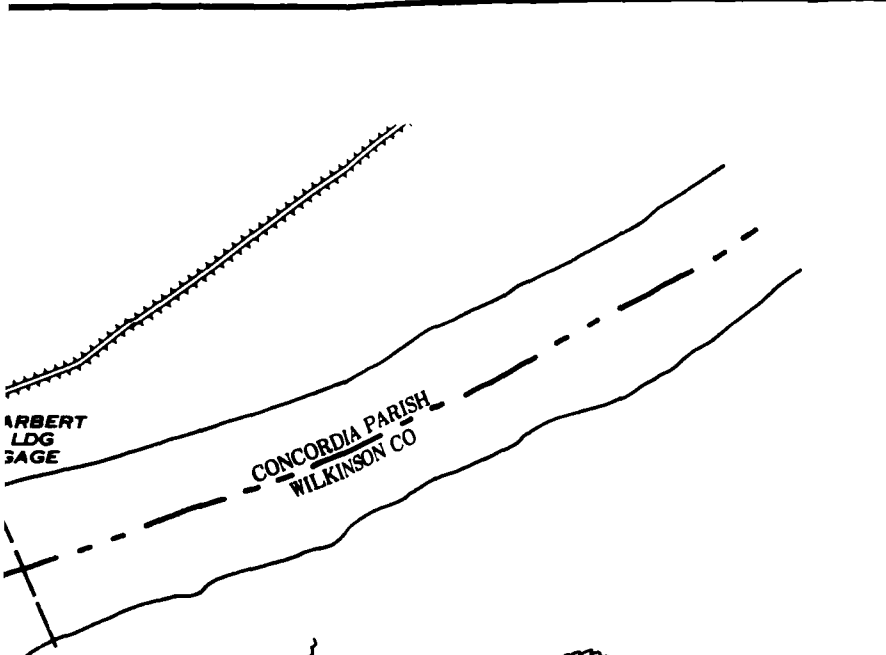
The study was initiated with a public meeting held in Baton Rouge, Louisiana, on 22 April 1976, to obtain the views of local interests relative to their problems and needs and to allow governmental agencies to indicate their interest in the study. At this meeting, participants requested Federal participation in the construction of an improved levee system to protect the penitentiary. A detailed plan of study was prepared in May 1977 and coordinated with interested Federal and state agencies. An information brochure was distributed in July 1980 to inform the public of the results of stage 2 studies and to request comments concerning any aspect of the proposed plans or their potential environmental impacts. The final public meeting was held on 25 September 1981 in Baton Rouge, Louisiana, to obtain comments from the public on the tentatively selected plan.

THE REPORT AND STUDY PROCESS

This report which includes the final environmental impact statement is organized into a main report and six appendixes. The main report provides brief nontechnical discussions of the problem identification, plan formulation, impact assessment, and evaluation tasks performed for the study. Appendix A provides problem identification. Appendix B consists of formulation of plans and the assessment and evaluation of detailed plans. Appendix C provides engineering investigations, design and cost estimates. Appendix D provides environmental data while appendix E contains economic data. Public views and responses to the draft report and draft environmental impact statement are in appendix F.

The planning process used in conducting this study is defined as a three-stage effort: reconnaissance (stage 1), development of intermediate plans (stage 2), and development of detailed plans (stage 3).





PRIOR STUDIES

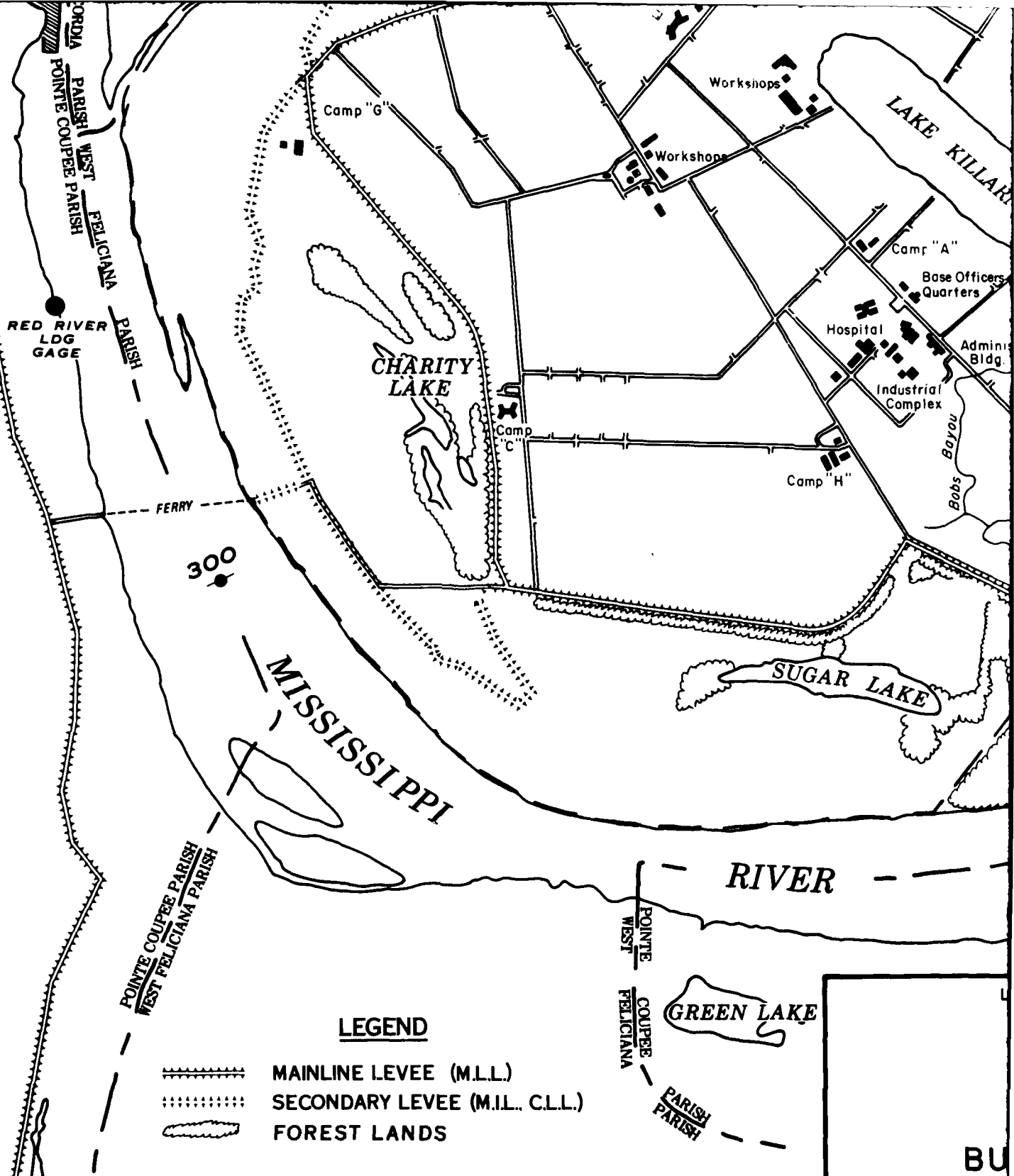
A draft detailed project report, entitled "Angola Levee, Louisiana," was submitted 3 May 1965 under authority of Section 205 of the 1948 Flood Control Act, as amended. The report concerned the proposed construction of a levee and drainage structure around the lands immediately adjacent to Sugar Lake, south of the penal farm proper. The proposed grade would have provided a 2-foot freeboard above the 10-year flood. Although that report was favorable, preparation of the final detailed project report was terminated because local interests were unwilling to provide the required local cooperation at that time. Due to the limited scope of the study covered in the report, it was of minimal use to the present planning effort.

PROBLEM IDENTIFICATION

An understanding of existing resources and expected development trends in the absence of Federal action is essential to identify the study area's problems, needs, and opportunities. Comparing national objectives to the problems, needs, and opportunities allows setting of planning objectives and identification of planning constraints. Once such a framework is established, formulation of alternative plans can proceed in a reasonable, orderly fashion. The following paragraphs discuss the present and future flooding conditions of the Louisiana State Penitentiary from the national viewpoint.

NATIONAL OBJECTIVES

During the past century the national emphasis on economic growth provided the primary basis for development of water and related land resources. The concept of multiple objectives to guide Federal programs has long been advocated. The nation is concerned that all regions share in the national wealth; that individuals have an opportunity to enjoy the



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natural environment; that the quality of the environment be protected and enhanced as the nation grows; and that the social consequences of contemplated water resource development actions be considered and taken into account during the planning process. Recent public debate and actions by the Congress and the Water Resources Council have enlarged the attention given noneconomic factors in preserving and developing national resources. Taken together, the policies established by these actions define the national objectives for water resource planning: national economic development, environmental quality, social well-being, and regional development.

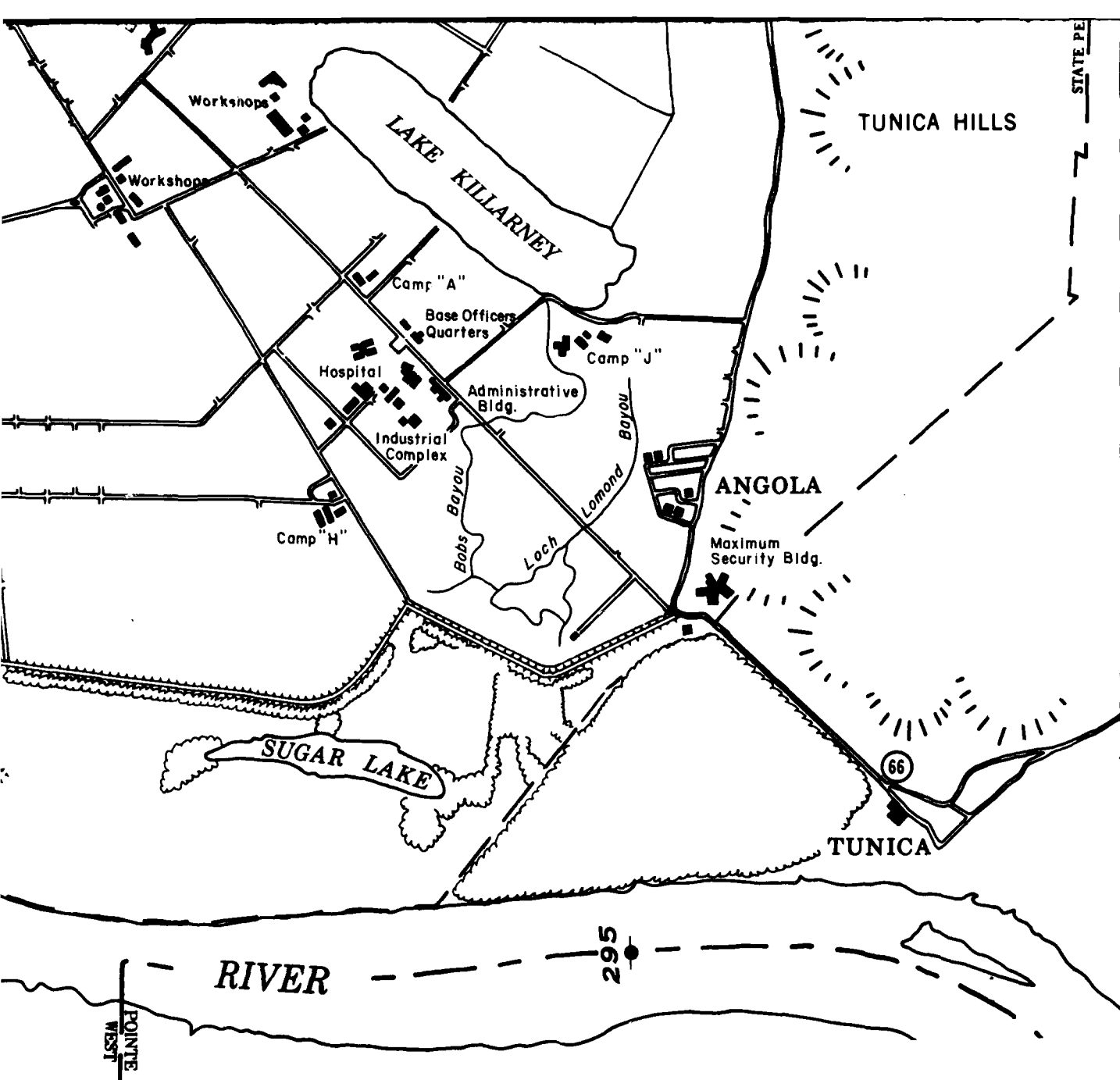
The basis for this policy includes, but is not limited to, the National Environmental Policy Act of 1969; the Fish and Wildlife Coordination Act, Public Law 91-190; Section 122 of Public Law 91-611 and Section 103 of the Water Resources Planning Act, Executive Order 11990, Protection of Wetlands; Public Law 89-80, which provides for establishment of the Principles and Standards for Planning Water and Related Land Resources, published 10 September 1973, subsequently amended; and the Corps of Engineers multi-objective planning regulations.

EXISTING CONDITIONS

A broad description of the existing conditions, made as a part of the problem identification task, is presented in the following paragraphs. (See plate 1 for map of area.)

ENVIRONMENTAL SETTING

The Louisiana State Penitentiary at Angola comprises 19,428 acres of which approximately 16,240 acres could be impacted by project work depending on the chosen course of action. The Tunica Hills, on the eastern portion of the property, will not be materially affected because of their elevation above the flood-prone area. The study area lies in the Mississippi Alluvial Plain, and is protected from Mississippi River floods by the existing non-Federal levees. The majority of the land is



LOUISIANA STATE PENITENTIARY LEVEE.
MISSISSIPPI RIVER

BUILDING LOCATION MAP

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

FILE NO. H-2-29413

PLATE 2

4

I
agricultural with ground surface elevations ranging from 40 to 55 feet National Geodetic Vertical Datum (NGVD).¹

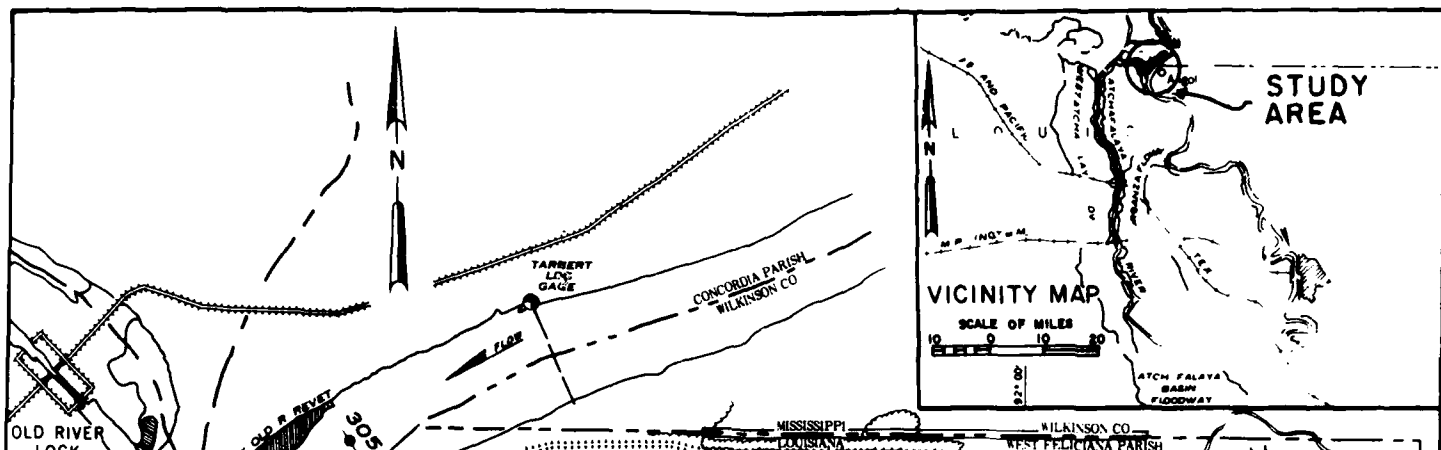
The prison compound is encircled by approximately 12.1 miles of mainline levee which abuts the Tunica Hills on the east. This non-Federal levee was originally built to a net elevation of 63 feet, and provides the only significant flood protection for the 15.3 square miles of penal farm facilities. Interior drainage is collected in Lake Killarney and along drainage channels and is discharged into Sugar Lake through a double barrel 6- by 6-foot concrete culvert equipped with flap gates or by an adjacent pumping station located in the southern part of the levee.

Two secondary levees, also built by non-Federal interests, are found in the study area. Monkey Island levee, with a net grade of 51 feet, provides minor protection to 858 acres of lands used for the cultivation of soybeans and corn. This levee is located on the northwestern part of the study area between the penal farm and the river. Prior to river stages reaching 36 feet, the inclosed area is drained by removing a section of the levee at the lower end; thereafter, the area is drained by portable pumps. Charity Lake levee has a net grade of 55 feet and provides minor protection to about 1,416 acres of pasturelands located on the southwest end of the farm. Rainfall runoff is drained by a 72-inch gated drainage pipe which is closed when river stages reach 36 feet; thereafter, the area cannot be drained until river stages recede below the elevation of water ponded in the interior.

CLIMATE

The project is located in a humid subtropical latitude, but is subject to significant polar influences during winter, as masses of cold

¹All elevations and stages in this report are in feet National Geodetic Vertical Datum (previously mean sea level) unless otherwise noted.



The Louisiana State penal farm and the town of Angola are cultural islands for all practical purposes. The town exists solely as a residence for the facility employees and their families.

RECREATION

Public accessibility to the study area is restricted to the use of Lake Killarney only and only on a very limited basis due to the nature of the facility. Additional recreation is afforded by the occasional fishing in Sugar Lake and other surrounding lakes, bayou and borrow pits by the penitentiary employees and their dependents.

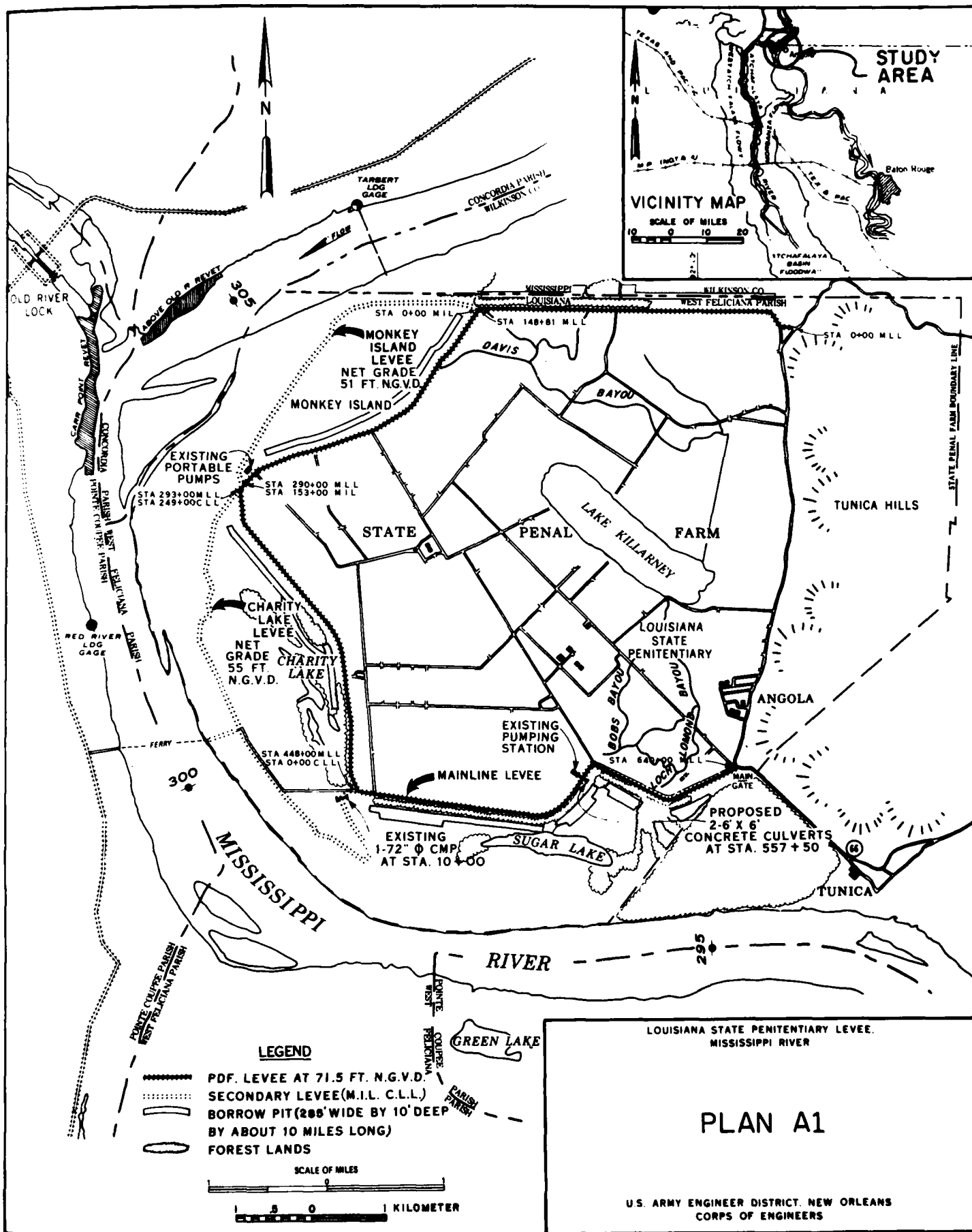
GEOLOGICAL CONDITIONS

The study area is located on the eastern edge of the lower Mississippi Alluvial Plain and is bounded on the north, west, and south by the Mississippi River. On the east side, the study area is bounded by the Tunica Hills which consist of Tertiary sediments capped by Quaternary aged upland deposits. The Louisiana State Penitentiary lies on 150 to 200 feet of Holocene alluvial deposits. The area is of low relief with ridges and swales typical of point bar topography. Several small lakes or ponds exist in the swales in addition to the large oxbow, Lake Killarney. Elevations range from 25 feet along the river to 50 feet along the natural levees and 63 feet along the manmade levees.

DEVELOPMENT AND ECONOMY

Approximately 16,240 acres of the 19,428 acres in the study area are subject to potential Mississippi River overflow. Of the area subject to overflow, about 4,100 acres located adjacent to the Mississippi River are unprotected and largely undeveloped. The remaining 12,140 acres are partially protected by a locally constructed and maintained levee system.

The mainline levee, which ties into the hills on the east, was built to an elevation that should provide 100-year protection to the 9,866



acres it incloses. However, it was not built to Federal standards and would require extensive flood-fight efforts to contain a 100-year flood. At present it provides approximately 30-year protection. Within the mainline levee, about 4,850 acres are used for pastureland and 4,390 acres are used for croplands. The net annual return on these lands is \$859,000 (1980 price levels).² Approximately 1,000 acres of pasturelands and 500 acres of croplands in the northern portion of the prison compound are subject to seepage and drainage problems during the yearly spring high water stages of the river.

As of 1976, the penitentiary buildings included 15 dormitories, a mess hall, workshops, a hospital, stores, schools and administration buildings. There are also a number of storage buildings and support facilities such as the laundries and power plants (see plate 2).

The estimated value of existing improvements subject to potential flood damages within the mainline levee is \$135.4 million; ongoing construction is expected to increase the value of such improvements to \$141.7 million. It is projected that the present inmate population of 4,200 will reach 4,500 in the near future and remain stable at that level thereafter. The current employee complement at the Angola complex is around 1,700. Of these, approximately 600 live within the compound, while the balance commute from outlying communities. In addition, there are over 300 employee dependents living within the prison compound.

The Monkey Island and Charity Lake areas are inclosed by secondary levees which tie into the mainline levee. The 2.9-mile long Monkey Island levee provides about 3-year protection to the 858 acres of cropland it incloses. The 4.7-mile long Charity Lake levee provides about 6-year protection to the 1,416 acres of pasturelands it incloses. These two areas have net annual returns of \$60,000 and \$7,000,

²All prices in this report are 1980 price levels.

respectively. It is expected that the current land-use pattern within the study area will remain stable within the foreseeable future.

Transportation routes into the study area include a ferry crossing on the Mississippi River near mile 300.5 AHP, Louisiana Highway 66 southeast from Tunica, and an unnumbered rural road from the northeast that connects with Highway 66.

STATUS OF EXISTING PLANS AND IMPROVEMENTS

FEDERAL

Congress approved a comprehensive plan for flood control in the Mississippi River Valley by passage of the Flood Control Act of 1928. Part of this flood control act provided for construction of an extensive levee system. On the west bank, the Mississippi River levee system extends from Allenville, Missouri, on the Little River diversion channel, generally southward to the vicinity of Venice, Louisiana. On the east bank, the levee system extends from Hickman, Kentucky, to Bohemia, Louisiana, except where interrupted by hills and tributary streams.

The design flowline applicable to the area of study is that presented in the "Refined 1973 MR&T Project Flood Flowline" (New Orleans District), June 1978.

The Old River low sill and overbank structures are located on the west bank of the Mississippi River at approximately mile 315 AHP. The Old River low sill structure is a gated control structure consisting of 11 bays (44 feet/bay) with a weir elevation of 10 feet in the four outer bays on each side and minus 5 feet in the three center bays. The structure is operated to distribute flows between the Mississippi and Atchafalaya Rivers at all stages. The overbank structure is a flood control structure consisting of 73 bays (44 feet/bay), with a weir elevation of 52 feet. The Old River low sill and overbank structures are designed to handle combined floodflows of approximately 630,000 cubic

feet per second (cfs). Both of these structures were completed in 1959 and were placed in operation in 1963.

The Corps plans to build an auxiliary structure just south of Old River Control Structure on the west bank of the Mississippi River. The auxiliary structure will have a gross width of 442 feet between faces of abutment training walls and will consist of six gated bays, each having a 62-foot clear opening between piers. The bays will have a weir crest elevation of minus 5 feet. A highway bridge will be built over the top of the structure to accommodate Louisiana Highway 15. The auxiliary structure is being proposed as an integral and essential element of the rehabilitation program for the Old River Control Structure.

The Old River Navigation lock, located at approximate river mile 303 AHP, provides for continued navigation between the Atchafalaya, Ouachita-Black, and Red Rivers, and the Mississippi River through Old River. It has a width of 75 feet, a usable length of 1,190 feet and a sill depth of minus 11.0 feet. Construction of the lock was initiated in 1958 and completed in 1962. The approach channels were completed and the lock was placed in operation in 1963. A roadway on the levee crosses the lock via a lift bridge which was completed in 1965. Average traffic through the lock, 1971-1975, was 4,767,956 tons.

The Morganza Control Structure is also located on the west bank at about mile 280 AHP. It is a flood control structure comprising 125 bays (28 feet 3 inches/bay) with a weir elevation of 37.5 feet. Under design conditions, this structure is capable of diverting 600,000 cfs of Mississippi River floodwaters into the lower Atchafalaya Basin via the Morganza Floodway. The structure was completed in 1950.

NON-FEDERAL

The present levee system surrounding the Louisiana State Penitentiary on the east bank of the Mississippi River is a state project owned by the Department of Corrections of the Louisiana Department of

Health and Human Resources and is not part of the Federal levee system. The levee system was built primarily by inmate labor and does not meet minimum Federal standards. The levees are in poor condition. They were not built to grade or section specifications required for the Federal levee system; hence, they do not provide the degree of protection afforded adjacent lands by the Federal levee system.

PROBLEMS, NEEDS, AND OPPORTUNITIES

The existing levee is deficient in both grade and cross-section. These inadequacies make failure a possibility during the high water season. It is predicted that a 30-year storm would be sufficient to cause failure. In the event of failure or the threat of failure, evacuation of the inmate population would be necessary. Finding an alternate location for the prisoners would pose a formidable problem. The area also has seepage and interior drainage problems which can be detrimental to the crops inside the levee system during high water.

At the initial public meeting, it was requested that the Angola levee be incorporated into the Federal levee system, the maximum justifiable land area be protected, adequate interior drainage facilities be provided, and an access road between the ferry landing and the penitentiary be constructed.

Two items were raised at the final public meeting. Two men who reside outside of the northeast corner of the penitentiary grounds expressed concern over the effect a higher levee would have on local drainage in their area. The warden repeated his request for an access road on the levee.

The need to provide an adequate level of flood protection for the Angola area, while minimizing adverse environmental impacts, was the major problem addressed in this study. The adverse social impacts associated with the relocation of the inmate population in the event of a levee failure is a problem inherent in meeting the basic objective of the authorizing resolutions.

The question raised at the public meeting on local drainage will be addressed in the Advanced Engineering and Design (AE&D) Phase of the study. An access road is unrelated to flood control or the authorizing resolution and the expenditure of funds for such construction is not a Corps of Engineers water resources planning function. Therefore, this request could not be addressed in the study. However, the inclusion of such a road in the design at non-Federal expense will be considered in AE&D.

PLANNING CONSTRAINTS

The general planning constraints of this project are derived from existing Federal flood protection regulations. Investigations are limited by the extent of both local and Federal interest in providing flood protection for the study area.

In the development of alternative plans, technical, economic, and environmental constraints were considered. Technically, the selected plan must be compatible with existing land use plans and the MR&T flood control project. Any selected plan would have to be economically justified. During plan evaluation, possible adverse environmental impacts were considered as well as measures to preserve or improve the environmental quality of the study area.

PLANNING OBJECTIVES

The goals of the planning effort were to reduce flood damages at the Louisiana State Penitentiary, to reduce the associated adverse social impacts in the state, to preserve the remaining bottomland hardwoods in the study area, and to create or enhance existing wildlife habitat.

CONDITIONS IF NO FEDERAL ACTION IS TAKEN

In response to Federal court orders in 1974, the state was required to reduce its prison population and improve the facilities at Angola.

The prison population was reduced between 1974 and 1977. During that time, the state planned extensive improvements to the existing facilities and also began construction of new facilities which will allow for an increase in population to 4,500. Hence, the potential loss of human life and damages from flooding is greatly increased. Future flooding, greater in magnitude than that experienced in the spring of 1973, would induce social and economic impacts upon the state if the levee system should fail, necessitating removal and relocation of hundreds of inmates at an estimated cost of \$214,000 annually. In addition, damages to existing and proposed facilities would occur. The social aspects of relocation of inmates would not be limited to Angola, but would adversely affect other areas of the state since public sentiment is strongly against the relocation of criminal elements. The most probable future, without Federal action, is that the levees would remain in their existing condition. Existing measures, such as flood-forecasting coupled with flood-fighting and evacuation, would be used to combat floods and the state would complete its improvement program as stated above and outlined in Appendix E.

FORMULATION OF PRELIMINARY PLANS

The formulation of the preliminary plans consisted of identifying appropriate measures responsive to the planning objectives which were then scaled and combined into an array of alternatives. The alternative plans thus developed were evaluated on the basis of socioeconomic, environmental, and engineering factors.

MANAGEMENT MEASURES

Both management measures which provide structural protection to the penal facilities, and nonstructural measures which could be employed to provide safety from flooding by relocation of the facility and evacuation during flood periods were considered.

C

APPENDIX A

FINANCIAL INFORMATION

TABLE 1

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Measures addressing environmental quality study objectives include avoiding placement of fill material in existing borrow pits and minimizing adverse impacts to the surrounding bottomland hardwoods and to the existing natural water bodies.

PLAN FORMULATION RATIONALE AND ANALYSIS OF PRELIMINARY PLANS

Mississippi River overflow is the major flood threat in the study area. Mississippi River channel improvement is beyond this study's scope; hence, levees or floodwalls comprise the main features of any structural plan. The maximum scope of levee work would be to construct a new levee along the Mississippi River's east bank to encompass the entire study area. Plans requiring only modifications to existing levees would be less costly and have fewer adverse environmental impacts associated with their construction than new levee work. Since lands outside the existing levee systems have marginal economic value, it was reasoned in the preliminary analyses that no consideration would be given to the protection of adjacent undeveloped lands. Plans including construction of floodwalls were also discarded because of the excessive costs involved and because they are susceptible to failure from marine accidents.

The construction of a ring levee or levees within the local levee system to increase protection of existing residences and other existing structures was ruled out due to high costs (a large number of sites would have to be considered); also, these ring levees would result in isolation of the sites during a major flood. This would be unacceptable to the prison staff for security reasons.

Elevating or restricting future development to the higher ground in the Tunica Hills was considered. Although this would reduce the future damages, it does not address the problem of housing the prisoners in the existing buildings in the event of a levee failure.

APPENDIX A

PROBLEM IDENTIFICATION

This appendix contains information on the study; on present and future conditions in the study area; on problems, needs, and opportunities relative to flood control in the area; and on the planning objectives.

STUDY AUTHORITY

This report is made in compliance with the provisions of the resolution presented below. The resolution was adopted on 5 September 1973, by the Committee on Public Works of the United States Senate at the request of Senator Russell B. Long of Louisiana. The resolution reads as follows:

"RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Chief of Engineers, Department of the Army, is hereby requested to review the report on the Mississippi River and Tributaries' Project, published as House Document 308 of the Eighty-eighth Congress, and other pertinent reports, with a view to determining whether incorporating the local levee at the Louisiana State Penitentiary into the Federal levee system is advisable."

PRIOR STUDIES AND STUDIES OF OTHERS

A US Army Corps of Engineers study was begun by a draft detailed project report, entitled "Angola Levee, Louisiana," submitted 3 May 1965, under authority of Section 205 of the 1948 Flood Control Act, as amended. The main concern of the report was the proposed construction of a levee and drainage structure around the lands immediately adjacent to

During periods when the Mississippi River is in flood, and the area inclosed by the mainline levee experiences heavy rainfall, drainage can only be accomplished by pumping. While structures within the mainline levee do not sustain damages from interior flooding, increasing pumping capacity would provide drainage relief for some of the more marginal agricultural lands within the compound; however, it was determined that the costs of providing drainage improvements to allow intensified agricultural activity was not economically justified. Therefore, such improvements were not studied further.

Nonstructural plans considered included relocation of facilities subject to flood damage, flood-proofing, flood-forecasting and evacuation plans, flood-fighting, and land-use measures. Relocation of the penal facilities' structures is infeasible because of costs and social aspects. Flood-proofing would not reduce the threat to lives and although it would prevent structural damages, the amount would not be sufficient for justification. Flood-forecasting for the Mississippi River is adequate; however, problems involved in evacuating thousands of prisoners in the event of a future flood threat are prodigious. Detailed information on inmate evacuation and subsistence costs can be found in appendix E. The state has flood-fighting capability as evidenced by their efforts during the 1973 flood. Only measures comprising construction of levees together with the provision of an adequate interior drainage system would respond to the objective of reducing potential damages from future floods. Therefore, all feasible nonstructural measures are already part of the without-project conditions.

ANALYSIS OF PLANS CONSIDERED

Nonstructural measures described in the previous section do not independently respond to the objective of providing a high degree of flood protection to the existing and planned facilities of the state penitentiary at Angola.

Sugar Lake, south of the penal farm proper. The proposed levee grade would have provided a 2-foot freeboard above the 10-year flood. The report was favorable; however, the final detailed project report was terminated due to the unwillingness on the part of the local interest to provide the required cooperation at that time. Due to the limited scope of the study covered in the report, it was of minimal use to the present planning effort.

EXISTING CONDITIONS

A broad description of the existing conditions made as part of the problem identification task is presented in the subsequent paragraphs.

ENVIRONMENTAL SETTING

The Louisiana State Penitentiary at Angola comprises 19,428 acres of which approximately 16,240 acres could be impacted by project work depending on the chosen course of action. The Tunica Hills, on the eastern portion of the property, will not be materially affected because of their elevation above the flood-prone area. The study area lies in the Mississippi Alluvial Plain, and is protected from Mississippi River floods by the existing non-Federal levees. The majority of the land is agricultural with ground surface elevations ranging from 40 to 55 feet National Geodetic Vertical Datum (NGVD).¹

The prison compound is encircled by approximately 12.1 miles of mainline levee which abuts the Tunica Hills on the east. This non-Federal levee was originally built to a net elevation of 63 feet, and provides the only significant flood protection for the 15.3 square miles

¹All elevations and stages in this report are in feet National Geodetic Vertical Datum (previously mean sea level) unless otherwise noted.

Seven structural plans were considered for improvement of the levee system at Angola. Plan descriptions and comparisons of costs, environmental impacts, and benefits for these alternatives are provided in subsequent paragraphs.

DESCRIPTION OF PLANS

The alternative plans are discussed below. (See plate 1 for map of area.)

Plan A - This plan would provide for raising and strengthening the existing mainline levee to a maximum elevation of 71.5 feet which would provide protection from the Project Design Flood (PDF) (67.5 feet plus 4-foot freeboard). The levee enlargement would be in conjunction with seepage relief wells or with seepage berms. The levee would have a 10-foot crown with side slopes of 1 vertical on 5.5 horizontal on the landside and 1 vertical on 4 horizontal on the riverside. No major improvements to the existing interior drainage system are included in this plan other than replacement in kind of the existing pair of 6- by 6-foot concrete culverts with two new 6- by 6-foot concrete culverts with sliding vertical sluice gates at mainline levee station 557+50.

Plan B - This plan would provide for enlargement of the existing mainline levee (except for the reach between mainline levee stations 148+81 and 290+00) and the Monkey Island levee to provide protection from the PDF. All of the improvements including the design criteria of the levee would be the same as plan A. A drainage structure and pumping station (17,000 gpm capacity) would be installed at Monkey Island levee station 153+00.

Plan C - This plan would provide for enlargement of the existing mainline levee (except for the reach between mainline levee stations 293+00 and 448+00) and the Charity Lake levee to provide protection from the PDF. All of the improvements including the design criteria of the levee would be the same as plan A. A drainage structure and pumping

of the penal facilities. Interior drainage is collected in Lake Killarney and along drainage channels and is discharged into Sugar Lake through a double barrel 6- by 6-foot concrete culvert equipped with flap gates or by an adjacent pumping station located in the southern part of the levee.

Two secondary levees, also built by non-Federal interests, are found in the study area. Monkey Island levee, with a net grade of 51 feet, provides minor protection to 858 acres of land used for the cultivation of soybeans and corn. This levee is located on the northwestern part of the study area between the penal farm and the river. Prior to river stages reaching 36 feet, the inclosed area is drained by removing a section of the levee at the lower end; thereafter, the area is drained by portable pumps. Charity Lake levee has a net grade of 55 feet and provides minor protection to about 1,416 acres of pasturelands located on the southwest end of the farm. Rainfall runoff is drained by a 72-inch gated drainage pipe which is closed when river stages reach 36 feet; thereafter, the area cannot be drained until river stages recede below the elevation of water ponded in the interior.

CLIMATE

GENERAL

The project is located in a humid subtropical latitude, but is subject to significant polar influences during winter, as masses of cold air periodically move southward across the plains and Mississippi Valley, displacing warm moist air. Prevailing wind flow is from a southerly direction during much of the year. This movement of maritime air from the Gulf of Mexico helps to temper extremes of summer heat, to shorten the duration of winter cold spells and provides a source of abundant moisture and rainfall. Winds are usually rather light. About 80 percent of hourly wind speed observations during the year are 12 mph or less.

station (21,000 gpm capacity) would be installed at Charity Lake levee station 10+00.

Plan D - This plan would provide for enlargement of the existing mainline levee (except for the reaches between mainline levee stations 148+81 and 290+00 and between station 293+00 and 448+00), Monkey Island levee and Charity Lake levee to provide protection from the PDF. All the elements including levee design and drainage structures discussed in plans A, B, and C would be incorporated in this plan.

Plan E - This plan would provide for enlargement of the existing mainline levee as in plan A while raising the Monkey Island levee to provide approximately 10-year flood protection (maximum height of 61 feet). The specifications for the 10-year levee, except for height, would be the same as those proposed for full protection. New drainage structures for these areas would be identical to those described for plans A and B.

Plan F - This plan would provide for enlargement of the existing mainline levee as in plan A while raising the Charity Lake levee to provide approximately 10-year flood protection (maximum height of 61 feet). The specifications for the 10-year levee, except for height, would be the same as those proposed for full protection. New drainage structures for these areas would be identical to those described for plans A and C.

Plan G - This plan would provide for enlargement of the existing mainline levee as in plan A while raising the Monkey Island and Charity Lake levees to provide approximately 10-year flood protection. All the elements of plans A, E, and F would be incorporated in this plan.

COMPARATIVE ASSESSMENT AND EVALUATION OF ALTERNATIVES

All of the plans investigated would provide protection to the penitentiary buildings from the MR&T PDF. Some of the plans also provide

in an earlier stage of succession and are of less value to wildlife. Common small game animals in the area include squirrel, bobwhite quail, mourning dove, and cottontail rabbit. Common furbearing animals within the area include mink, otter, muskrat, raccoon, skunk, beaver, opossum, fox, and bobcat. Study area lakes and borrow pits support a variety of fish species; however, the species most popular are white and black crappie.

CULTURAL RESOURCES

The National Register of Historic Places, as published in yearly and weekly supplements of the "Federal Register," was consulted through 23 June 1981. The closest National Register property to the project is Trudeau Landing, east of the community of Tunica, Louisiana. It is well outside the study boundaries and will not be affected by the proposed levee improvements. At least five prehistoric, protohistoric and historic sites (16WF 14, 15, 16, 21, and 28) are located on the bluff overlooking the penitentiary. Site 16WF1, an historic Tunica village, is located south of the proposed borrow pit closest to the main gate. This site has been previously disturbed by construction of Highway 66 and the penitentiary hospital. Additional known sites within prison boundaries are 16WF3, a possible Poverty Point mound and historic cemetery just north of the main gate, and 16WF2, a probable Houma village dating from 1680 to 1708 on the natural levee east of Lake Killarney.

The Louisiana State penal farm and the town of Angola are cultural islands for all practical purposes. The town exists solely as a residence for the facility employees and their families.

RECREATION

Public accessibility to the study area is restricted to the use of Lake Killarney only and on a very limited basis due to the nature of the facility. Additional recreation is afforded from the occasional fishing in Sugar Lake and other surrounding lakes, bayous, and borrow pits by the penitentiary employees and their dependents.

varying levels of protection to the outlying agricultural areas. The increases in the design flowline resulting from changes in overbank flood conditions caused by the alternative levee alignments are considered minor and will not impact the operation of the Old River control structure and/or the Red River backwater area fuseplug levee. Details of these impacts are contained in appendix C.

The rehabilitation of the levee would include a riverside and/or landside enlargement of the existing levee and seepage control measures. These points are addressed in appendix C, and additional borings would be taken once a levee plan is approved. Seepage berms were selected over relief wells because seepage berms are less costly to construct and maintain than relief wells.

The major environmental impacts which could result from the implementation of the plans include the destruction of bottomland hardwoods and wetlands which serve as important wildlife habitats and short term deterioration of water quality caused by resuspension of sediments.

Bottomland hardwoods and associated forests were considered to be the most significant environmental resource in the study area. Since they provide important wildlife habitat, negative impacts are highly undesirable. The acres of bottomland hardwoods that would be adversely affected by each plan are shown in table 1.

TABLE 1--ACRES OF BOTTOMLAND HARDWOODS AFFECTED

	<u>Alternative Plans</u>						
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>
Acres affected	79	410	141	439	261	79	261

GEOLOGICAL CONDITIONS

The study area is located on the eastern edge of the lower Mississippi Alluvial Plain and is bounded on the north, west, and south by the Mississippi River. On the east side, the study area is bounded by the Tunica Hills, which consist of Tertiary sediments capped by Quaternary aged upland deposits. The Louisiana State Penitentiary lies on 150 to 200 feet of Holocene alluvial deposits. The area is of low relief with ridges and swales typical of point bar topography. Several small lakes or ponds exist in the swales in addition to the large oxbow, Lake Killarney. Elevations range from 25 feet along the river to 55 feet along the natural levees and 63 feet along the manmade levees.

DEVELOPMENT AND ECONOMY

Approximately 16,240 acres of the 19,428 acres in the study area are subject to potential Mississippi River overflow. Of the area subject to overflow, about 4,100 acres located adjacent to the Mississippi River are unprotected and largely undeveloped. The remaining 12,140 acres are partially protected by a locally constructed and maintained levee system.

The mainline levee, which ties into the hills on the east, was built to an elevation that should provide 100-year protection to the 9,866 acres it incloses. However, it was not built to Federal standards and would require extensive flood fight efforts to contain a 100-year flood. Within the mainline levee, about 4,850 acres are used for pastureland and 4,390 acres are used for croplands. The net annual return on these lands is \$859,000 (1980 price levels).² Approximately 1,000 acres of pasturelands and 500 acres of croplands in the northern

²All prices in this report are 1980 price levels.

Low-lying portions of the study area in the Monkey Island and Charity Lake areas are frequently flooded; these periodic inundations serve to biologically rejuvenate these areas. Except for plan A which does not affect these low-lying areas, the other plans investigated would reduce the rejuvenating flooding effect to these areas; thus, plans B through G would result in a loss of wildlife habitat. A more detailed environmental analysis is contained in appendix D.

Some short term impacts on water quality, due to construction activities, would occur in the study area. The construction of temporary haul roads across the existing borrow pits would cause the introduction of suspended sediments into the waters of the borrow pits. This would result in increased turbidity and decreased dissolved oxygen. Some suspended sediments could also be introduced into the small lakes and bayous of the study area incidental to excavation and earth moving (these would be short term impacts only). By using mechanical earth-moving equipment to excavate the borrow material, the probability of the significant release of pesticides and metals which could potentially be trapped in the borrow and fill material would be very small. The introduction of fill material into existing borrow pits would be avoided by constructing landward levee enlargements in locations where the existing borrow pits abut the levee.

Borrow pits would have to be created and/or enlarged. This would create aquatic habitat. Quality of the habitat created would be dependent upon borrow pit design. The borrow pits located inside the Monkey Island and Charity Lake levees would be adversely affected by plans B through G since the rejuvenating flooding effect would be reduced as described above. The possibility exists for creation of high quality aquatic habitat which would be beneficial to terrestrial and aquatic species.

The economic analysis was based on a 100-year project life. It was assumed that three mainline levee crevasses would occur during this time, causing substantial damage to structures and necessitating evacuations of

the prison inmates. The basis for levee crevasse was derived from the Mississippi River PDF at the Red River Landing gauge across from Angola. The net elevation of the existing levee system is 63 feet while the project elevation in the area is somewhat higher. River stages which could cause failure of the levee have a frequency, on the average, of approximately three times during the 100-year project life. It was assumed that after failure the levee would be rebuilt to its prior conditions.

A stage of 60 feet NGVD and a forecast of a continued rising crest is considered appropriate for determining the frequency of an emergency evacuation. Such a crest should occur about once every 20 years of project life. Significant amounts of flood-fight efforts were expended in both 1973 and 1979, and additional state aid was required to maintain a sandbagging effort. It was assumed that no future significant flood-fighting would take place at stages less than those where flooding began during the flooding of 1975, or at an 8-year frequency on the average.

Flood damages which would be prevented by all action plans or savings in costs which result from the increased protection from all action plans include: damages prevented to structures, savings in emergency evacuation and subsistence costs, and savings in emergency flood-fight costs.

Although borrow areas created during construction would afford some additional recreational potential for fishing, future use of these areas for that purpose is expected to be minimal.

Table 2 is a summary of the first costs, annual charges, benefits and benefit-cost ratios for the alternative plans. Detailed estimates of first costs are shown in table C-4. In addition to the overall benefit-cost ratio, an incremental benefit-cost ratio was computed for plans B through G with plan A being the base condition. The table shows the relative merits of the added benefits versus the additional cost incurred in upgrading the protection of the outlying areas.

STATUS OF EXISTING PLANS AND IMPROVEMENTS

FEDERAL

Congress approved a comprehensive plan for flood control in the Mississippi River Valley by passage of the Flood Control Act of 1928. Part of this flood control act provided for construction of an extensive levee system. On the west bank, the Mississippi River levee system extends from Allenville, Missouri, on the Little River diversion channel, generally southward to the vicinity of Venice, Louisiana. On the east bank, the levee system extends from Hickman, Kentucky, to Bohemia, Louisiana, except where interrupted by hills and tributary streams.

The design flowline applicable to the area of study is that presented in the "Refined 1973 MR&T Project Flood Flowline" (New Orleans District), June 1978.

The Old River low sill and overbank structures are located on the west bank of the Mississippi River at approximately mile 315 above Head of Passes. The Old River low sill structure is a gated control structure consisting of 11 bays (44 feet/bay) with weir elevations of 10 feet in the four outer bays on each side and minus 5 feet in the three center bays. The structure is operated to distribute flows between the Mississippi and Atchafalaya Rivers at all stages. The overbank structure is a flood control structure consisting of 73 bays (44 feet/bay), with a weir elevation of 52 feet. The Old River low sill and overbank structures are designed to handle combined floodflows of approximately 630,000 cubic feet per second (cfs). Both of these structures were completed in 1959 and placed in operation in 1963.

The Corps plans to build an auxiliary structure just south of Old River control structure on the west bank of the Mississippi River. The auxiliary structure will have a gross width of 442 feet between faces of abutment training wall and will consist of six gated bays, each having a 62-foot clear opening between piers. The bays will have a weir crest

TABLE 2--FIRST COST AND ANNUAL CHARGES--PRELIMINARY LEEVE PLANS

First Cost	Plan A	Plan B	Plan C	Plan D	Plan E	Plan F	Plan G
<u>Lands</u>	1,159,000	1,056,000	1,097,000	990,000	1,335,000	1,456,000	1,628,000
Construction	11,985,000	19,283,000	17,262,000	24,500,000	18,335,000	14,786,000	21,174,000
Contingencies	2,996,000	4,821,000	4,315,000	6,125,000	4,584,000	3,697,000	5,294,000
Engineering and Design	899,000	1,446,000	1,295,000	1,838,000	1,375,000	1,109,000	1,588,000
Supervision and Administration	899,000	1,446,000	1,295,000	1,838,000	1,375,000	1,109,000	1,588,000
Total First Costs	17,938,000	28,052,000	25,265,000	35,291,000	27,004,000	22,157,000	31,272,000
Present Value of Investment ¹	19,971,000	31,231,000	28,128,000	39,292,000	30,065,000	24,667,000	34,816,000
<u>Annual Charges</u>							
Interest and Amortization	1,474,000	2,305,000	2,076,000	2,900,000	2,219,000	1,821,000	2,570,000
Operation, Maintenance, and Replacement	14,000	27,000	32,000	47,000	29,000	32,000	50,000
Total Annual Charges	1,488,000	2,332,000	2,108,000	2,947,000	2,248,000	1,853,000	2,620,000
Total Annual Benefits	2,089,000	2,171,000	2,190,000	2,272,000	2,162,000	2,179,000	2,252,000
Net Benefits	601,000	-161,000	82,000	-675,000	-86,000	326,000	-368,000
Benefit-Cost Ratio	1.40	0.93	1.04	0.77	0.96	1.18	0.86
Incremental Benefit-Cost Ratio ²	-	0.10	0.16	0.13	0.10	0.25	0.14

¹Construction is estimated to start in 1987 and to be completed in 2 years. Significant benefits are estimated to start accruing in 1989 (project base year).

²Incremental benefit-cost ratio = $\frac{\text{Benefits Plan "X"} - \text{Plan A}}{\text{Costs Plan "X"} - \text{Plan A}}$

elevation of minus 5 feet. A highway bridge will be built over the tops of the structure to accommodate Louisiana Highway 15. The auxiliary structure is being proposed as an integral and essential element of the rehabilitation program for the Old River control structure.

The Old River navigation lock, located at approximate river mile 303 above Head of Passes, provides for continued navigation between the Atchafalaya, Ouachita-Black, and Red Rivers, and the Mississippi River through Old River. It has a width of 75 feet, a usable length of 1,190 feet and a sill depth of minus 11.0 feet. Construction of the lock was initiated in 1958 and completed in 1962. The approach channels were completed and the lock was placed in operation in 1963. A roadway on the levee crosses the lock via a lift bridge which was completed in 1965. Average traffic through the lock, 1971-1975, was 4,767,956 tons.

The Morganza control structure is also located on the west bank at about mile 280 above Head of Passes. It is a flood control structure comprising 125 bays (28 feet 3 inches/bay) with a weir elevation of 37.5 feet. Under design conditions, this structure is capable of diverting 600,000 cfs of Mississippi River floodwaters into the lower Atchafalaya Basin via the Morganza Floodway. The structure was completed in 1950.

NON-FEDERAL

The present levee system, surrounding the Louisiana State Penitentiary on the east bank of the Mississippi River, is a state project owned by the Department of Corrections of the Louisiana Department of Health and Human Resources and is not part of the Federal levee system. The levee system was built primarily by inmate labor and does not meet minimum Federal standards. The levees are in poor condition. They were not built to grade or section specifications required for the Federal levee system; hence, they do not provide the degree of protection afforded adjacent lands by the Federal levee system.

CONCLUSIONS (SCREENING)

Three of the structural alternative plans (A, C, and F) have positive net benefits and a benefit-to-cost ratio greater than 1. The incremental benefit-to-cost ratios for plans B through G as compared to plan A were all less than 1. Therefore, it is not economically justified to provide increased flood protection to the outlying areas, i.e., Monkey Island and Charity Lake areas; also these plans would result in more adverse environmental impacts than plan A.

Plan A was determined to be economically justified and satisfied the planning objectives for reducing flood damages and associated adverse social impacts. Of all the structural plans it would cause the least environmental damage. Therefore, it was decided to select only plan A for detailed study.

In the detailed study process, plan A was reanalyzed to determine if its potential adverse environmental impacts could be further minimized by modifying construction methods. Plan A1, the least environmentally damaging plan, was formulated in the detailed study process.

As previously determined, feasible nonstructural measures are part of the without-project condition, i.e., the nonstructural plan is the same as the no-action plan.

ASSESSMENT AND EVALUATION OF DETAILED PLANS

Information presented in the following paragraphs describes each of the plans considered in detail. In addition to plan descriptions, the significant beneficial and adverse impacts and an evaluation and trade-off analysis are discussed. Responsibilities for implementation are presented for each of the detailed plans. Also presented is an apportionment of costs based on traditional cost-sharing policies.

CONDITIONS IF NO FEDERAL ACTION IS TAKEN

In response to Federal court orders in 1974, the state was required to reduce its prison population and improve the facilities at Angola. The prison population was reduced between 1974 and 1977. During that time, the state planned extensive improvements to the existing facilities and also began construction of new facilities which allowed an increase in population to 4,500. Hence, the potential loss of human life and damages from flooding is greatly increased. Future flooding greater in magnitude than that experienced in the spring of 1973 would induce social and economic impacts upon the state if the levee system should fail, necessitating removal and relocation of hundreds of inmates at an estimated cost of \$214,000 annually. In addition, damages to existing and proposed facilities would occur. The social aspects of relocating the inmates would not be limited to Angola, but would adversely affect other areas of the state since public sentiment is strongly against the relocation of criminal elements. The most probable future, without Federal action, is that the levees would remain in their existing condition. Existing measures, such as flood-forecasting coupled with flood-fighting and evacuation, would be used to combat floods and that the state would complete its improvement program as stated above and outlined in appendix E.

PROBLEMS, NEEDS, AND OPPORTUNITIES

The deficiencies in the levee grade and cross-section, when combined with the high river stages which occurred in the spring of 1973, posed a serious threat to the penitentiary, requiring an extensive flood fight effort. The integrity of the levee system was challenged, requiring preparations to evacuate the inmate population. Had evacuation become necessary, the problem of providing a secure location to house the prisoners would have been formidable. In addition to the threat of a levee crevasse, the serious seepage and interior drainage problems were great enough in 1973 to delay crop planting and reduce the harvest. Improvements to the facility, necessitated by court orders and other

PLAN A

PLAN DESCRIPTION

This plan (shown on plate 3) consists of raising and strengthening the mainline levee to a maximum height of 71.5 feet NGVD by levee enlargement to the riverside or landside with seepage berms where seepage has been observed. The levee would have a 10-foot crown with side slopes of 1 vertical on 5.5 horizontal on the landside and 1 vertical on 4 horizontal on the riverside. Existing and proposed levee cross-sections are shown on plates C-3 and C-4. This would provide protection from the standard PDF with 4 feet of freeboard.

Included in this plan is the replacement of the existing 6- by 6-foot concrete culverts with two new 6- by 6-foot concrete culverts with sliding vertical sluice gates. The new culverts will be 290 feet long with stop logs at either end for secondary closure. No change would be made to the three existing electrical pumps which have a total pumping capacity of 120,000 gpm. The water is pumped over the levee through two 36-inch diameter cast iron pipes. These pipes would require modifications so that they would pass over the top of the new levee.

Levee enlargement would be done to the landside of the existing levee where existing borrow pits are up against the levee. The fill material would be taken from new borrow pits on the riverside of the existing mainline levee with average dimensions of 10 feet deep by 285 feet wide by about 10 miles long running parallel to the levee. The distance from the riverside toe of the improved levee to the landside edge of the borrow pits would be approximately 450 feet.

IMPACT ASSESSMENT

NATIONAL ECONOMIC DEVELOPMENT IMPACTS

The first cost of plan A is estimated at \$17,938,000 and the total annual cost estimated at \$1,488,000, including \$1,474,000 for interest

factors, are increasing the potential damage from flooding in the penal farm. The 1973 flood, estimated to have a return frequency of once in 13 years, required a flood fight expenditure of over \$240,000 in the Angola area.

Maintenance of this locally built levee system is inadequate. The areas where grazing is permitted suffer from deep depressions in the levee, brought about by the continual crossing of cattle during wet weather. At several locations access roads are cut through the levee decreasing its height by about 6 to 8 feet.

Specific requests made at the initial public meeting were as follows: (1) incorporate the Angola levee system into the Federal levee system, (2) make a detailed and comprehensive study of the area for the establishment of adequate levees to protect the maximum land area that can be justified and also provide adequate interior drainage facilities, and (3) include construction of a road to provide access between the ferry landing and the front gate of the penitentiary. Two items were raised at the final public meeting. Two men who reside outside of the northeast corner of the penitentiary grounds expressed concern over the effect a higher levee would have on local drainage in their area. The warden repeated his request for an access road on the levee.

The need to provide an adequate level of flood protection for the Angola area, while minimizing adverse environmental impacts, was the major problem addressed in this study. The adverse social impact associated with the relocation of the inmate population in the event of a levee failure is a problem inherent in meeting the basic objective of the authorizing resolution.

The question raised at the public meeting on local drainage will be addressed in the Advanced Engineering and Design (AE&D) Phase of the study. A ferry landing access road is unrelated to flood control or the authorizing resolution, and the expenditure of funds for such road construction is not a Corps of Engineers water resources planning

and amortization of the initial investment and \$14,000 for operation and maintenance (October 1980 price levels).

The benefits attributable to plan A are estimated to average \$2,089,000, annually (7 3/8 percent interest rate). These benefits are composed of \$1,847,000 in savings in the reduction of flood damages due to the destruction of buildings and crops, \$214,000 in savings in inmate evacuation costs, and \$25,000 in savings in emergency flood-fighting costs.

The average annual net benefits are estimated at \$601,000, and the ratio of average annual benefits to average annual costs is 1.40.

ENVIRONMENTAL IMPACTS

Water Bodies and Associated Wetlands. This plan would result in direct impacts to approximately 10 acres of open water and wetlands. These impacts would result from excavation of borrow material from these areas within the confines of the borrow area alignment as indicated on plate 3 and the deposition of fill material for haul roads into the existing borrow pits. Construction activities would cause immediate increases in turbidity and resultant decreases in light penetration in the affected borrow pits' waters. A Section 404(b) (Clean Water Act) evaluation would not be required for this plan. Section 404(f) provides an exemption for temporary haul roads. Constructing the haul roads with culverts to allow natural water movement to continue and removing the roads after completion of construction alleviates the need for a 404(b) study.

Bottomland Hardwoods and Associated Forests. This plan would result in the destruction of approximately 79 acres of forests. These losses would occur due to clearing for the borrow excavation area and for haul roads between the excavation area and the levee. After construction, natural forest succession would eventually result in the establishment of bottomland hardwood forests on those areas cleared for haul roads.

function. Therefore, this expressed need could not be addressed in the study. However, the inclusion of such a road in the design at non-Federal expense will be considered in AE&D.

PLANNING CONSTRAINTS

The general planning constraints of this project are derived from the flood protection regulations. These constraints are limited to the extent of both local and Federal interest in providing flood protection for this study area.

Technical constraints required that the selected plans be consistent with local and regional land use plans and that contemplated flood protection improvements be compatible with the MR&T flood control project.

The economic constraints used to optimize the national economic development objective were those prescribed by the Principles and Standards for Planning Water and Related Land Resources, as published in the "Federal Register" on 10 September 1973. All alternative plans were evaluated based on 1980 price levels, and an interest rate of 7 3/8 percent.

The inclusion of flood protection to the Monkey Island and Charity Lake areas is dependent on the improvement of each of these areas being incrementally justified.

The environmental constraints applied in plan formulation provided for consideration of all adverse impacts on the natural environment, and for the consideration of measures to protect, preserve, and enhance the environmental quality of the study area. Plans were evaluated considering national economic development and environmental quality as coequal national objectives.

Fishery Resources. This plan calls for the excavation of approximately 345 acres of borrow material resulting in the conversion of that entire area to aquatic habitat available for fisheries utilization. Fish populations would be established in most borrow pits by inundation from high spring river flows, but population development would be dependent upon population development of lower members of the food chain. Fish population development in the Charity Lake borrow segment would not progress at the same rate as other areas because this area receives infrequent river flooding. Fish population establishment in this area would be dependent upon hydraulic connection to Charity Lake.

Wildlife Resources. This plan would result in significantly greater adverse impacts to terrestrial wildlife resources than the implementation of the other plan. Approximately 79 acres of woodlands would be destroyed with this plan. Those wildlife individuals whose territory includes woodlands to be removed for excavation or rights-of-way purposes will either be displaced or destroyed by this action. Creation of approximately 345 acres of borrow pit would provide habitat for terrestrial wildlife highly dependent upon aquatic habitat. The amount of use, however, would be dependent upon food-producing vegetation developing along shorelines. The conversion of approximately 266 acres of open land to borrow areas would result in the permanent removal of that amount of open land habitat from the study area and a corresponding loss to all species inhabiting that area.

Threatened and Endangered Species. This plan would, overall, provide beneficial impacts to endangered species within the study area. The creation of open, deepwater areas by borrow pit excavation would provide suitable habitat for courtship and breeding for the American alligator.

Audubon Society Blue List. Plan A would not significantly affect any species of bird on the 1981 Blue List. However, the primary habitat for the majority of birds on the Blue List found in the study area is forest, of which some would be destroyed.

The responsiveness of plans was measured against the criteria of acceptability, certainty, completeness, effectiveness, efficiency, geographical scope, national economic development/benefit-cost ratio, environmental consequences, reversibility, and stability; and the acceptance of the selected plan by the general public which was determined through public involvement procedures.

PLANNING OBJECTIVES

The goals of the planning effort were to reduce flood damages at the Louisiana State Penitentiary and associated adverse social impacts in the state, to preserve the remaining bottomland hardwoods in the study area, and to create or enhance existing wildlife habitat.

The study used measures that maximized net benefits from flood damage reduction and measures that minimized adverse environmental impacts. It included investigations on nonstructural, as well as structural measures and combinations thereof, including consideration of Executive Order No. 11988. The effects of any improvements on other Corps of Engineers' projects, particularly the MR&T project, were investigated thoroughly. Studies were made to evaluate the social impact upon the state if this levee system should fail, necessitating the evacuation of hundreds of inmates to other state facilities. Environmental quality and economic considerations were equal planning objectives within the study frame work.

Recreational Resources. The borrow areas created during project construction would afford some additional recreational potential for fishing. The future occasional use of the borrow areas by the Louisiana State Penitentiary employees and their dependents is forecasted to be minimal.

Agricultural Land Resources. This plan would result in beneficial impacts through the prevention of a levee crevasse to the mainline levee and the resulting inundation of approximately 9,240 acres of prime and unique farmlands. A comparatively insignificant number of cropland acres would receive adverse impacts in areas where landside levee enlargement and seepage berms are required. These changes of farmland to levee and seepage berms would still have a potential for pastureland usage causing the impacts to be even smaller. Riverside borrow excavation would also convert 266 acres of agricultural lands, which are used primarily as pasturelands and are not classified as prime farmland, to borrow pits. This would constitute a total loss of these lands to agricultural production.

Cultural Resources. This plan would not affect any cultural resources presently listed on the National Register of Historic Places. Because of its proximity to the confluence of the Mississippi and Red Rivers, the study area has been an advantageous location for trade, settlement or encampment through time. It is expected that historic sites exist along of the base of the hill line, along Davis, Bobs, and Loch Lomond Bayous, and on natural levees adjacent to relict Mississippi River channels such as Charity Lake, Sugar Lake, and Lake Killarney. An intensive cultural resources survey of the proposed impact zone will be conducted during advanced feasibility studies (phase I AE&D). The impact corridor appears to follow a relict 19th century river course. If sites are located within this corridor, it is expected that the majority will be historic and may include buried shipwrecks.

SOCIAL WELL-BEING IMPACTS

Plan A would have significant effects on social well-being in the study area as well as the State of Louisiana as a whole. The evacuation of the prisoners would cause undue hardship to residents surrounding the prison as well as to residents of areas to which the prisoners would be transferred. The implementation of this plan would serve to alleviate the risk of evacuating the prisoners, thereby producing a favorable affect on the social well-being of the area as a whole.

REGIONAL DEVELOPMENT IMPACTS

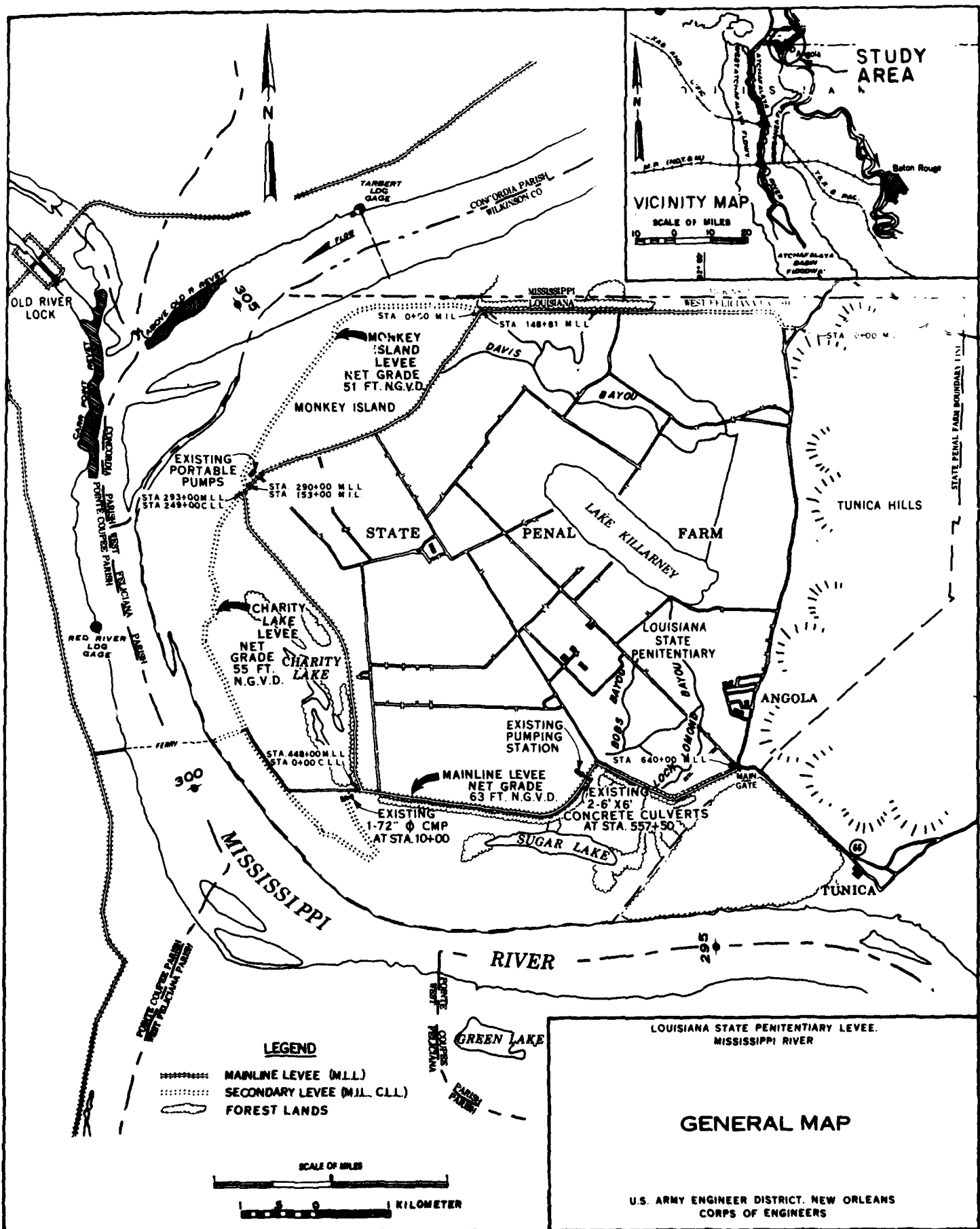
The induced development effected by plan A would be the utilization of the underemployed labor potential that is located in the study area. Project construction and maintenance operations would provide minor increases in real income and income distribution.

EVALUATION AND TRADE-OFF ANALYSIS

Plan A fulfills the primary planning objectives of reducing flood damages and associated adverse social impacts for the penal farm. The estimated first cost is \$17,938,000. The benefit-to-cost ratio is 1.40 to 1 and the excess average annual benefits over cost are \$601,000, the higher of either plan.

Plan A also complies with some of the environmental quality objectives in that it minimizes certain adverse environmental impacts.

From an overall standpoint, plan A is the most economical plan for providing increased flood protection for the study area. The plan is implementable and acceptable.



IMPLEMENTATION RESPONSIBILITIES

COST ALLOCATIONS

All costs for the construction and maintenance of plan A would be allocated to flood control.

COST APPORTIONMENT

Under traditional cost-sharing policies of the 1936 Flood Control Act the total first cost of \$17,938,000 would be apportioned \$16,779,000 to the Federal Government and \$1,159,000 to non-Federal interests. The non-Federal portion of the first cost would be the cost of all lands, easements, rights-of-way, and relocations. All of the estimated annual operation and maintenance costs for the levee of \$14,000 would be borne by the non-Federal interests. Any costs associated with operation and maintenance of or modifications to the pumping stations would be borne by non-Federal interests.

PLAN A1

PLAN DESCRIPTION

This plan (shown on plate 4) consists of raising and strengthening the mainline levee to the same specifications as in plan A.

Adverse environmental impacts would be minimized in this plan. Levee enlargement would be done to the landside of the existing levee where existing borrow pits abut the levee so as to not place any fill material in the borrow pits. The fill material would be taken from new borrow pits (10 feet by 285 feet by 10 miles long) parallel to the riverside of the levee. The distance from the toe of the levee to the borrow pits would be approximately 450 feet. Extra care would be taken to avoid bottomland hardwoods when digging the new borrow pits. All wetlands contiguous to Charity Lake and Sugar Lake would also be avoided when digging the borrow pits. The construction of the haul roads from the new borrow pits would be done in such a way that waters of wetlands

and existing borrow pits hydrologically connected to Charity or Sugar Lake would not be affected by the placement of fill material.

IMPACT ASSESSMENT

NATIONAL ECONOMIC DEVELOPMENT IMPACTS

The first cost of plan A1 is estimated at \$18,274,000 and the total annual cost estimated at \$1,515,000, including \$1,501,000 for interest and amortization of the initial investment and \$14,000 for operation and maintenance (October 1980 price levels).

The benefits attributable to plan A1 are identical to those of plan A; average annual net benefits are estimated at \$574,000, and the ratio of average annual benefits to average annual cost is 1.38 (7 3/8 percent interest rate).

ENVIRONMENTAL IMPACTS

Water Bodies and Associated Wetlands. This plan would result in direct impacts to approximately 1 acre of open water and wetland. These impacts would result from the introduction of fill material into the existing borrow pits to serve as haul roads across these areas. A Section 404(b) evaluation would not be required for this plan. As with plan A, it is eligible for exemption under Section 404(f).

Bottomland Hardwoods and Associated Forests. This plan would result in comparatively minimal impacts to forested areas. As indicated in the plan description, destruction to forested areas would be avoided, with limitations, with this plan. However, required haul roads through wooded areas would result in the destruction of approximately 5 acres of forest. The kinds of impacts upon forests would be the same with this plan as with plan A; however, the quantity of impacts would be greatly reduced.

APPENDIX B

FORMULATION, ASSESSMENT, AND EVALUATION OF DETAILED PLANS

Agricultural Land Resources. This plan would result in the same beneficial and adverse impacts to all lands within the mainline levee as plan A. However, borrow excavation in agricultural lands used as pasturelands outside the levee would convert 345 acres of these lands to borrow pits. This action would constitute a total loss of these lands to agricultural production.

Cultural Resources. This plan would result in the same impacts as in plan A with the same additional studies being conducted after authorization.

SOCIAL WELL-BEING IMPACTS

Plan A1's impact on social well-being would be the same as plan A.

REGIONAL DEVELOPMENT IMPACTS

Plan A1's project construction and maintenance operations would provide slightly larger increases in real income and income distribution than those which would be associated with plan A.

EVALUATION AND TRADE-OFF ANALYSIS

Plan A1 fulfills the primary planning objectives of reducing flood damages and associated adverse social impacts for the penal farm. It also creates aquatic habitat and has a lesser impact on bottomland hardwoods than plan A. The estimated first cost is \$18,274,000, which is somewhat higher than plan A. The benefit-to-cost ratio is 1.38 and the excess average annual benefits over costs are \$574,000 which is only slightly less than plan A.

Of all plans considered, plan A1 most closely meets both national economic development and environmental quality planning objectives. It is implementable and acceptable.

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FOUNDATION, AGREEMENT, AND EVALUATION OF DETAILED PLANS

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PLAN FORMULATION METHODOLOGY AND ANALYSIS OF PRELIMINARY PLANS	P-1
ANALYSIS OF PLANS CONTINUED	P-1
DESCRIPTION OF PLANS	P-1
COMPARATIVE APPRAISAL AND EVALUATION OF ALTERNATIVES	P-1
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economically justified, plan A is less costly and provides higher average annual excess benefits over costs than plan A1. Table 3 is a summary of first cost, annual charges, benefits and benefit-cost ratios for the two detailed plans. Detailed estimates of first costs for these plans are shown in table C-5. A summary comparison of the plans is shown in table 4.

TABLE 3--FIRST COST AND ANNUAL CHARGES--DETAILED LEVEE PLANS
(October 1980 price levels; 7 3/8 percent interest rate)

	<u>Plan A</u>	<u>Plan A1</u>
	\$	\$
<u>First Cost</u>		
Lands 1,159,000	1,159,000	
Construction	11,985,000	12,225,000
Contingencies	2,996,000	3,056,000
Engineering and Design	899,000	917,000
Supervision and Administration	<u>899,000</u>	<u>917,000</u>
Total First Cost	17,938,000	18,274,000
Present Value of Investment	19,971,000	20,345,000
<u>Annual Charges</u>		
Interest and Amortization	1,474,000	1,501,000
Operation, Maintenance, and Replacement	14,000	14,000
Total Annual Charges	1,488,000	1,515,000
Total Annual Benefits	2,089,000	2,089,000
Net Benefits	601,000	574,000
Benefit-Cost Ratio	1.40	1.38

APPENDIX B

FORMULATION, ASSESSMENT, AND EVALUATION OF DETAILED PLANS

FORMULATION OF PRELIMINARY PLANS

The formulation of the preliminary plans consisted of identification of appropriate measures responsive to the planning objectives, that were scaled and combined into an array of plans. The alternative plans considered in this report were evaluated on the basis of their socioeconomic, environmental, and engineering factors.

MANAGEMENT MEASURES

In addition to management measures that would provide structural protection to the penal facilities, nonstructural measures that may be employed to provide safety from flooding include the relocation of the facility and evacuation of inmates, employees, and dependents during flood periods.

Measures for addressing the environmental quality study objectives include the avoidance of placing fill material in existing borrow pits and minimizing adverse impacts to the surrounding bottomland hardwoods and to the existing natural lakes and bayous.

PLAN FORMULATION RATIONALE AND ANALYSIS OF PRELIMINARY PLANS

Mississippi River overflow is the major flood threat in the study area. Mississippi River channel improvement is beyond this study's

scope, due to the limited study area and the large cost associated with the different features that would be needed to improve the channel; hence, levees or floodwalls comprise the main feature of any structural plan. The maximum scope of levee work would be to construct a new levee along the Mississippi River's east bank to encompass the entire study area. Plans requiring only modifications to existing levees would be less costly and have fewer adverse environmental impacts associated with their construction than new levee work. Also, lands outside the existing levee systems have marginal economic value. Thus, it was reasoned in the preliminary analyses that no consideration would be given to the protection of adjacent undeveloped lands. Plans comprising construction of floodwalls were also discarded because of the excessive costs involved and because they were inconsistent with the levee designs for the MR&T project.

The construction of a ring levee or levees within the local levee system to increase protection to existing residences and other existing structures was ruled out due to the high cost involved in providing flood protection for the large number of sites that would have to be considered. Construction of these ring levees would also result in isolation of the sites during a major flood for an extended period of time. Isolation of sites is unacceptable to the prison personnel for security reasons. Elevating future development would also be unacceptable as it too would result in isolation.

Locating planned future development in flood-free lands in the Tunica Hills area was considered. The rugged terrain in this area is not suitable however. In addition, this would not address the social impacts of possible evacuation of prisoners still housed in the lowlands during a flood event.

During periods when the Mississippi River is in flood, and the area inclosed by the mainline levee experiences heavy rainfall, drainage can only be accomplished by pumping. This situation occurred in the springs of 1973 and 1979. While structures within the mainline levee do not

sustain damages from interior flooding, existing pumping capacity is inadequate to provide drainage relief for some of the more marginal agricultural lands within the compound. It was determined that the costs of providing drainage improvements (pumps and channels) necessary to allow intensified usage of these marginal lands would not be economically justified. Therefore, such improvements were not studied in further detail.

Nonstructural plans considered include relocations of facilities subject to flood damage, flood-proofing, flood-forecasting and evacuation plans, flood-fighting, and land use measures. Relocation of the penal facilities' structures is infeasible because of the costs involved, social aspects, and difficulties in securing an adequate site for this massive complex and its population. At present the state is anticipating spending \$6,240,000, of which \$600,000 is ongoing renovation work, while the remaining \$5,640,000 is for employee homes and apartments which will be built on high ground at the base of the Tunica Hills. Flood-proofing could be accomplished at Angola by raising all structures on pilings to an elevation above that of the design flood. In the event of a breach in the levee, the penal farm would fill to the average river stage elevation of 63 feet NGVD. Ground elevations presently vary from approximately 40 to 55 feet NGVD; consequently, a levee failure causes immediate and massive flooding to a great depth. Flood-proofing would not reduce the threat to lives and, although it would prevent damages to structures, the amount would not be sufficient for justification. Therefore, flood-proofing has been determined to be impractical and expensive. Flood-forecasting for the Mississippi River is adequate; however, the immense financial and logistical problems involved in evacuating thousands of prisoners in the event of a future flood threat are prodigious. The cost of a long term evacuation in the event of a levee crevasse would be approximately \$4,600,000. A short term evacuation, where a crevasse did not occur, would cost approximately \$1,250,000. More detailed information on inmate evacuation and subsistence costs can be found in appendix E. The state has flood-fighting capability as evidenced by their efforts during the 1973 flood. Only measures comprising construction of levees together with the provision of an adequate interior

TABLE 4--SUMMARY COMPARISON OF ALTERNATIVE PLANS (CONTINUED)

	EXISTING CONDITIONS	PLAN A (NED)		PLAN A1 (LED, Recommended Plan)		NO ACTION (Nonstructural Plan)
3. Social Well-Being						
a. Redevelopment ^a and effects on distribution of real income	are presently in the study area.	water bodies and associated wetlands, and 266 acres of open land. Borrow pits would create 345 acres of aquatic habitat.	associated wetlands, and 345 acres of open land would be affected. Borrow pits would create 345 acres of aquatic habitat.			
	None	Increased employment and income opportunities to middle and lower income families.	Same as plan A.			None
b. Injurious displacement of people ^a and community disruption ^a	Area is subject to possible levee crevasse and attendant disruption and economic and social costs.	Plan reduces the likelihood of a levee crevasse and hence the tremendous economic and social upheaval associated with evacuation.	Same as plan A.			Area is subject to possible levee crevasse and attendant disruption and economic and social costs.
4. Regional development						
a. Effects on employment and income	None	Additional employment opportunities generated by construction will provide increases in real income and income redistribution.	Same as plan A.			None
b. Other effects	Not evaluated.	Not evaluated.	Not evaluated.			Not evaluated.
III. PLAN EVALUATION						
1. Contribution to planning objectives						

drainage system would respond to the objective of reducing potential damages from future floods. Therefore, all feasible nonstructural measures are already part of the without-project condition.

ANALYSIS OF PLANS CONSIDERED

Nonstructural measures described in the previous section do not independently respond to the objective of providing a high degree of flood protection to the existing and planned facilities of the state penitentiary at Angola.

Seven structural plans were considered for improvement of the levee system at Angola. Plan descriptions and comparisons of costs, environmental impacts, and benefits for these plans are provided in subsequent paragraphs.

DESCRIPTION OF PLANS

The alternative plans are discussed below. (See plate B-1 for map of area.)

Plan A - This plan would provide for raising and strengthening the existing mainline levee to a maximum elevation of 71.5 feet which would provide protection from the Project Design Flood (PDF) (67.5 feet plus 4-foot freeboard). The levee enlargement would be in conjunction with seepage relief wells or with seepage berms. The levee would have a 10-foot crown with side slopes of 1 vertical on 5.5 horizontal on the landside and 1 vertical on 4 horizontal on the riverside. No major improvements to the existing interior drainage system are included in this plan other than replacement in kind of the existing pair of 6- by 6-foot concrete culverts with two new 6- by 6-foot concrete culverts with sliding vertical sluice gates at mainline levee station 557+50.

Plan B - This plan would provide for enlargement of the existing mainline levee (except for the reach between mainline levee stations

TABLE 4--SUMMARY COMPARISON OF ALTERNATIVE PLANS (CONTINUED)

EXISTING CONDITIONS		PLAN A (NED)	PLAN AI (LED, Recommended Plan)	NO ACTION (Nonstructural Plan)
a. Provide protection from levee crevasse	Not applicable.	Average annual benefits of \$2,089,000, including damages prevented to structures and agriculture, and savings in inmate evacuation and flood-fight costs.	Same as plan A.	None
b. Preserve or create wetlands, where practicable, or minimize adverse effects.	Not applicable.	Positive contribution, 335 acres of marsh and open water gained.	Positive contribution 344 acres of marsh and open water gained.	Neutral contribution, existing wetlands and open water preserved.
c. Preserve bottomland hardwoods where practicable or minimize adverse effects	Not applicable.	Negative contribution, 79 acres of bottomland hardwoods lost.	Negative contribution, 5 acres bottomland hardwoods lost. Adverse effect minimized.	Neutral bottomland hardwoods contribution, preserved.
2. Net effects				
a. Net NED Average annual benefits	Not applicable.	\$601,000	\$574,000	None
b. Net EQ effects	Not applicable.	-79 acres bottomland hardwoods +335 acres water bodies and associated wetlands -266 acres open lands	-5 acres bottomland hardwoods +344 acres water bodies and associated wetlands -345 acres open lands	None
c. Net social well-being effects	Not applicable.	Significantly beneficial.	Significantly beneficial.	Significantly adverse.
3. Plan response to associated evaluation criteria				

148+81 and 290+00) and the Monkey Island levee to provide protection from the PDF. All of the improvements including the design criteria of the levee would be the same as plan A. A drainage structure and pumping station (17,000 gpm capacity) would be installed at Monkey Island levee station 153+00.

Plan C - This plan would provide for enlargement of the existing mainline levee (except for the reach between mainline levee stations 293+00 and 448+00) and the Charity Lake levee to provide protection from the PDF. All of the improvements including the design criteria of the levee would be the same as plan A. A drainage structure and pumping station (21,000 gpm capacity) would be installed at Charity Lake levee station 10+00.

Plan D - This plan would provide for enlargement of the existing mainline levee (except for the reaches between mainline levee stations 148+81 and 290+00 and between stations 293+00 and 448+00), Monkey Island levee and Charity Lake levee to provide protection from the PDF. All the elements including levee design and drainage structures discussed in plans A, B, and C would be incorporated in this plan.

Plan E - This plan would provide for enlargement of the existing mainline levee as in plan A while raising the Monkey Island levee to provide approximately 10-year flood protection (maximum height of 61 feet). The specifications for the 10-year levee, except for height, would be the same as those proposed for full protection. New drainage structures for these areas would be identical to those described for plans A and B.

Plan F - This plan would provide for enlargement of the existing mainline levee as in plan A while raising the Charity Lake levee to provide approximately 10-year flood protection (maximum height of 61 feet). The specifications for the 10-year levee, except for height, would be the same as those proposed for full protection. New drainage

structures for these areas would be identical to those described for plans A and C.

Plan G - This plan would provide for enlargement of the existing mainline levee as in plan A while raising the Monkey Island and Charity Lake levees to provide approximately 10-year flood protection. All the elements of plans A, E, and F would be incorporated in this plan.

COMPARATIVE ASSESSMENT AND EVALUATION OF ALTERNATIVES

All of the plans investigated would provide protection to the penitentiary buildings from the MR&T PDF. Some of the plans also provide varying levels of protection to the outlying agricultural areas. The increases in the design flowline resulting from changes in the overbank flood conditions caused by the alternative levee alignments are considered minor and will not impact the operation of the Old River control structure and/or the Red River backwater area fuseplug levee. Details of these impacts are contained in appendix C.

The rehabilitation of the levee would include a riverside and/or landside enlargement of the existing levee and control measures for seepage problems observed along this levee system during the flood of 1973. The two methods considered for controlling underseepage were landside seepage berms and relief wells. Since the seepage analysis was based on very limited boring information which did not indicate a seepage problem, the recommendations in this report were made based on observed seepage during the 1973 high water. The recommendation to provide for underseepage control was made with the intent that more borings would be needed to further study both stability and seepage in future detailed designs. These points are addressed in appendix C, and additional borings will be taken once a levee plan is approved.

Relief wells were ruled out for controlling the underseepage problems since they would increase the amount of underseepage entering the protected area, thus requiring more water to be handled by the

TABLE 4--SUMMARY COMPARISON OF ALTERNATIVE PLANS (CONTINUED)

EXISTING CONDITIONS		PLAN A (NED)	PLAN A1 (LED, Recommended Plan)	NO ACTION (Nonstructural Plan)
a. Acceptability	Not applicable.	Plan is solidly supported by local, state, and regional publics. No opposition has been expressed.	Same as plan A.	Public social concerns are that Angola remain a viable repository for the criminal element. No action does not alleviate the possibility of levee crevasse and social disruption.
b. Effectiveness	Not applicable.	Plan creates viable prison compound in a rural area with rich agricultural lands on which prisoners can be kept busy in self-supporting enterprise.	Same as plan A.	No action, as with non-structural plans such as permanent relocation or flood-proofing has fewer net outputs than either plans A or A1; particularly in regards to intangible public social concerns.
c. Geographical scope	Not applicable.	Statewide concerns of massive relocation of prisoners subsequent to a levee crevasse are alleviated.	Same as plan A.	No action maintains serious statewide social concerns for possible relocations.
d. NED benefit/cost ratios	Not applicable.	1.40	1.38	
4. Rankings of plans				
a. NED objective	Not applicable.	1 (NED plan)	2	3
b. EQ objective		2	1 (LED plan)	3
c. Social well-being account		1	1	3

interior drainage system and pumping stations. They would also require more maintenance and testing which would increase necessary maintenance cost, whereas seepage berms are generally much less costly to construct and maintain than relief wells.

The major environmental impacts which could result from the implementation of the plans include the destruction of bottomland hardwoods and wetlands which serve as important wildlife habitats, and short term deterioration of water quality caused by resuspension of sediments.

Bottomland hardwoods and associated forests were considered to be the most significant environmental resource in the study area. Since they provide important wildlife habitat, negative impacts are highly undesirable. The acres of bottomland hardwoods that would be adversely affected by each plan are shown in Table B-1.

TABLE B-1--ACRES OF BOTTOMLAND HARDWOODS AFFECTED

	<u>Alternative Plans</u>						
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>
Acres affected	79	410	141	439	261	79	261

Low-lying portions of the study area in the Monkey Island and Charity Lake areas are frequently flooded. The periodic inundations serve to rejuvenate these areas by opening up new and productive areas for fish and aquatic animals. Except for plan A, which does not affect these low-lying areas, the other plans investigated would reduce the rejuvenating effect to these areas in various degrees. These other plans would have a detrimental effect on the wetland areas by encouraging a switch to agricultural usage and loss of wildlife habitat.

Construction activities would have some short term impacts on water quality within the study area. The construction of temporary haul roads

TABLE 4--SUMMARY COMPARISON OF ALTERNATIVE PLANS (CONTINUED)

EXISTING CONDITIONS	PLAN A (RED)			PLAN A1 (LED, Recommended Plan)		NO ACTION (Nonstructural Plan)
	2	1	3			
d. Regional development account						
IV. IMPLEMENTATION RESPONSIBILITY						
1. Traditional						
a. First cost						
1) Federal	\$16,779,000	\$17,115,000				
2) Non-Federal	\$1,159,000	\$1,159,000				
3) Total	\$17,938,000	\$18,274,000				
b. Annual cost						
1) Federal	\$1,377,000	\$1,404,000				
2) Non-Federal	\$111,000	\$111,000				
3) Total	\$1,488,000	\$1,515,000				

1/ Costs and benefits are computed at October 1980 price levels, and 7 3/8 percent interest rate, and a 100-year project life.

across the existing borrow pits would cause the introduction of suspended sediments into the waters of the borrow pits. Increased suspended sediments would increase the turbidity in the borrow pit waters and could be accompanied by lowering of dissolved oxygen levels and release of nutrients.

Some suspended sediments could also be introduced into the small lakes and bayous of the study area incidental to excavation and earth-moving operations. The effects of increased suspended sediments would be short term only. Because construction activities would be accomplished through the use of mechanical earth-moving equipment, significant release of pesticides and metals which could potentially be trapped in the borrow and fill material would be unlikely.

The introduction of fill material into existing borrow pits will be avoided by constructing landward levee enlargements in locations where the existing borrow pits abut the levee. Borrow pits would be created and/or enlarged. The enlargement or creation of borrow pits would create aquatic habitat. Quality of the habitat created would be dependent upon borrow pit design. The borrow pits located inside the Monkey Island and Charity Lake levees would be adversely affected by plans B through G since the rejuvenating flooding effect would be reduced as previously described. The possibility exists for creation of high quality aquatic habitat which would be beneficial to terrestrial species such as wading birds, waterfowl, and furbearers, as well as aquatic species.

The economic analysis was based on a 100-year project life. It was assumed that three mainline levee crevasses would occur during this time, causing substantial damage to structures and agriculture and necessitating long term evacuation of the prison inmates. The basis for these levee crevasses was derived from the Mississippi River stage frequency curve, at the Red River Landing gauge directly across from Angola. The net elevation of the existing levee system is 63 feet, including 2 feet of freeboard, while the project elevation in the area is somewhat higher. River stages which could cause failure of the levee

RATIONALE FOR NATIONAL ECONOMIC DEVELOPMENT PLAN

Plan A would provide the maximum average annual excess benefits over cost and therefore, was designated the national economic development plan.

RATIONALE FOR LEAST ENVIRONMENTALLY DAMAGING PLAN

Both plans A and A1 would create the same amount of aquatic habitat through the digging of the borrow pits which would provide for more wildlife habitat; however, plan A1 would impact less on woodlands and wetlands and thus would be more desirable, from an environmental standpoint, than plan A and was therefore designated the least environmentally damaging plan.

RATIONALE FOR RECOMMENDED PLAN

Both plans A and A1 would provide approximately \$600,000 average annual excess benefits over costs while plan A1's environmental impacts would be less than plan A. From an overall standpoint, the minor increases in cost associated with plan A1 are small when compared to the greater adverse environmental impacts that would accompany plan A. Therefore, plan A1 is selected for recommendation.

CONCLUSION

The level of protection currently provided to the Louisiana State Penitentiary constitutes a serious problem, not only for the inmates and the employees residing at Angola but for the rest of the state as well. In the event of an actual or threatened levee crevasse, evacuation and relocation of the prisoners would be a tremendous logistical problem.

have a frequency of occurrence of once in 30 years, on the average, or approximately three times during the 100-year project life. It was assumed that after each failure the levee would be rebuilt to prior conditions.

A stage of 60 feet NGVD and a forecast of a continued rising crest is considered appropriate for determining the frequency of an emergency evacuation. Such a crest should occur about every 20 years of project life. Significant amounts for flood-fight efforts were expended during the high water periods of 1973 and 1979. In both instances, additional state aid was required to maintain a sandbagging effort. Crests in 1973 and 1979 were 58.2 and 59.2, respectively. In 1974 and 1975, flood crests were lower. In 1974, flood-fighting costs were nominal, whereas in 1975, a flood crest somewhat higher than in 1974 required flood-fighting, although not to the extent of 1973 or 1979. Therefore, it was assumed that no future significant flood-fighting would take place at stages less than those where flood-fighting began in the flooding of 1975, or at an 8-year frequency.

Flood damages which would be prevented by all action plans or savings in costs which result from the increased protection from all action plans include: damages prevented to structures, savings in emergency evacuation and subsistence costs, and savings in emergency flood-fight costs.

Although borrow areas created during construction would afford some additional recreational potential for fishing, recreation benefits cannot be calculated as public access is limited. Future use of the borrow areas by facility employees and their families is expected to be minimal.

Table B-2 is a summary of the first costs, annual charges, benefits and benefit-cost ratios for the alternative plans. Detailed estimates of first costs are shown in tables C-4 and C-5. In addition to the overall benefit-cost ratio, an incremental benefit-cost ratio was computed for plans B through G with plan A being the base condition. The incremental

Besides the security problem of transporting and housing thousands of prisoners, public sentiment is against temporarily housing prisoners in other parts of the state. In addition to the adverse social effects associated with prisoner relocation, there exists the potential for loss of life as well as the potential for structural damages and agricultural losses.

The recommended plan would provide protection to the penitentiary from the Project Design Flood for the Mississippi River. The possibility of a levee crevasse with its attendant disruption and costs would be greatly reduced. Flood damages to agriculture would also be reduced. This plan is also the least environmentally damaging plan and would provide for the creation of 345 acres of aquatic habitat while minimizing the adverse impacts on bottomland hardwoods. Although the recommended plan has a slightly higher cost than the NED plan, this cost increase is justified by the preservation of the bottomland hardwoods.

A summary of the cost and benefits associated with the recommended plan at 1981 price levels and the current interest rate (7 5/8 percent) is presented in table 5.

TABLE B-2--FIRST COST AND ANNUAL CHARGES--PRELIMINARY LEVEE PLANS

	Plan A	Plan B	Plan C	Plan D	Plan E	Plan F	Plan G
FIRST COST							
Lands	\$1,159,000	\$1,056,000	\$1,097,000	\$990,000	\$1,350,000	\$1,456,000	\$1,628,000
Construction	11,985,000	19,283,000	17,262,000	24,500,000	18,335,000	14,786,000	21,174,000
Contingencies	2,996,000	4,821,000	4,315,000	6,125,000	4,584,000	3,697,000	5,294,000
Engineering and Design	899,000	1,446,000	1,295,000	1,838,000	1,375,000	1,109,000	1,588,000
Supervision and Administration	899,000	1,446,000	1,295,000	1,838,000	1,375,000	1,109,000	1,588,000
Total First Costs	17,938,000	28,052,000	25,265,000	35,291,000	27,004,000	22,157,000	31,272,000
Present Value of Investment ¹	19,971,000	31,231,000	28,128,000	39,292,000	30,065,000	24,667,000	34,816,000
ANNUAL CHARGES							
Interest and Amortization	1,474,000	2,305,000	2,076,000	2,900,000	2,219,000	1,821,000	2,570,000
Operation, Maintenance and Replacement	14,000	27,000	32,000	47,000	29,000	32,000	50,000
Total Annual Charges	1,488,000	2,332,000	2,108,000	2,947,000	2,248,000	1,853,000	2,620,000
Total Annual Benefits	2,089,000	2,171,000	2,190,000	2,272,000	2,162,000	2,179,000	2,252,000
Net Benefits	601,000	-161,000	82,000	-675,000	-86,000	326,000	-368,000
Benefit-Cost Ratio	1.4	0.93	1.04	0.77	0.96	1.18	0.86
Incremental Benefit-Cost Ratio ²	--	0.10	0.16	0.13	0.10	0.25	0.14

¹Construction is estimated to start in 1987 and to be completed in 2 years.

Significant benefits are estimated to start accruing in 1989 (project base year).

²Incremental benefit-cost ratio = $\frac{\text{Benefits Plan "X" - Plan A}}{\text{Costs Plan "X" - Plan A}}$

TABLE 5

RECOMMENDED PLAN - BENEFITS AND COST
(Interest rate - 7 5/8 Percent, Oct 81 price levels)

	Recommended Plan Plan A1 <u>(\$)</u>
<u>First Cost</u>	
Lands	1,159,000
Construction	14,227,000
Contingencies	3,574,000
Engineering and Design	1,070,000
Supervision and Administration	1,070,000
Total First Cost	<u>21,100,000</u>
Present Value of Investment	23,575,000
<u>Annual Charges</u>	
Interest and Amortization	1,799,000
Operation, Maintenance, and Replacement	15,000
Total Annual Charges	1,814,000
Total Annual Benefits	2,298,000
Net Benefits	484,000
Benefit-Cost Ratio	1.27

RECOMMENDATIONS

I have considered all significant aspects of this study including environmental and economic effects and engineering feasibility as they relate to the overall public interest. I recommend that the existing Mississippi River and Tributaries project, authorized by the Flood Control Act approved 15 May 1928, be modified so as to incorporate the mainline levee at the Louisiana State Penitentiary at Angola into the Federal levee system to provide protection from the Project Design Flood in accordance with plan A1 selected herein with such further modifications thereto as at the discretion of the Chief of Engineers may be advisable; at a first cost to the United States presently estimated at \$21,100,000 with annual operation, maintenance, and replacement costs to be borne by non-Federal interests presently estimated at \$15,000.

The traditional requirements for local cooperation for the Mississippi River levee project are specified in Section 3 of the 1928 Flood Control Act. This report contains information based upon application of the following traditional requirements.

a. Maintain all flood control works after their completion, except controlling and regulating spillway structures, including special relief levees, maintenance includes normally such matters as cutting grass, removal of weeds, local drainage, and minor repairs of main river levees;

b. Agree to accept land turned over to them under provision of Section 4 of the Flood Control Act of 1928; and

c. Provide without cost to the United States, all rights-of-way for levee foundations and levees.

The Administration is reviewing project cost-sharing and financing across the entire spectrum of water resource development functions and has submitted proposed legislation to Congress for navigation projects.

significant beneficial and adverse impacts and an evaluation and trade-off analysis are discussed. Responsibilities for implementation are presented for each of the detailed plans. Also presented is the cost apportionment based on traditional cost-sharing policies.

PLAN A

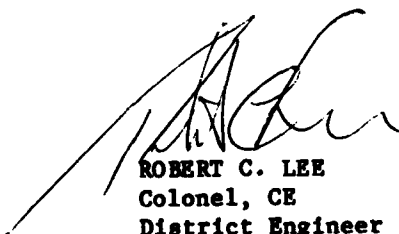
PLAN DESCRIPTION

This plan (shown on plate B-2) consists of raising and strengthening

The basic principle governing the development of specific cost-sharing policies is that whenever possible the cost of services produced by water projects should be paid for by their direct beneficiaries. It also is recognized that the Federal Government can no longer bear the major portion of the financing of water projects. New sources of project financing, both public and private, will have to be found.

While specific policies applicable to the Louisiana State Penitentiary Levee, Mississippi River, project have not yet been established, non-Federal interests can expect that, under the Administration's financing and cost-sharing principles, the level of their financial participation will need to be significantly greater than in the past. Accordingly, I recommend authorization to construct and to otherwise implement the project subject to cost-sharing and financing arrangements which are satisfactory to the President and Congress.

In a letter dated 28 December 1981, the Louisiana Department of Corrections expressed its acceptance of and support for this project and indicated its willingness to financially participate, subject to the approval of the Louisiana Legislature. This letter has been included in Appendix G.



ROBERT C. LEE
Colonel, CE
District Engineer

distance between the toe of the improved levee and the borrow pits would be approximately 450 feet.

IMPACT ASSESSMENT

NATIONAL ECONOMIC DEVELOPMENT IMPACTS

The first cost of plan A is estimated at \$17,938,000 and the total annual cost estimated at \$1,488,000, including \$1,474,000 for interest and amortization of the initial investment and \$14,000 for operation and maintenance.

The benefits attributable to plan A are estimated to average \$2,089,000 annually. These benefits are attributable to savings in the reduction of flood damages due to the destruction of buildings and crops; the deterrent of the evacuation of prisoners and compound employees and their dependents, i.e., savings in evacuation costs; and savings in emergency flood-fighting costs.

The average annual net benefits are estimated at \$601,000, and the ratio of average annual benefits to average annual costs is 1.40.

ENVIRONMENTAL IMPACTS

Water Bodies and Associated Wetlands. This plan would result in direct impacts to approximately 10 acres of open water and wetlands. These impacts would result from excavation of borrow material from these areas within the confines of the borrow area alignment as indicated on plate 2 and the deposition of fill material for haul roads into the existing borrow pits. Constructing activities would cause immediate increases in turbidity and resultant decreases in light penetration in the affected borrow pits' waters. The excavation action would result in the removal of the vegetative canopy which would eventually allow greater light intensity and subsequently higher water temperatures and greater photosynthetic activity. A Section 404(b) (Clean Water Act) evaluation

would not be required for this plan. Section 404(f) provides exemptions for temporary haul roads. Construction the haul roads with culverts to allow natural water movement to continue and removing the roads after completion of construction alleviates the need for a 404(b) study. The impact of this plan upon the water quality of the Mississippi River would be insignificant. Impacts upon wetland resources would be negative, due to the reduction of the area of normal water fluctuations, of general habitat, food chain productivity, and nesting, spawning, rearing, and resting sites for terrestrial and aquatic species.

Bottomland Hardwoods and Associated Forests. This plan would result in the destruction of approximately 79 acres of forests. These losses would occur due to clearing for the borrow excavation area and for haul roads between the excavation area and the levee. The destruction of these forested areas would reduce the buffer effect presently provided against river wave action to the levee and the soil-holding function provided by growing tree roots. After construction, natural forest succession would eventually result in the establishment of bottomland hardwood forests on those areas cleared for haul roads. Significant sediment deposition has not been occurring recently in proposed borrow pit areas; therefore, a mixture of riverfront hardwood species, depending upon the seed source, would become established on those cleared areas.

Fishery Resources. This plan calls for the excavation of approximately 345 acres of borrow pit resulting in the conversion of that entire area to aquatic habitat available for fisheries utilization. Habitat quality would be very low in the borrow pits initially as diversity would be lacking completely until submergent vegetation becomes established. Fish populations would be established in most borrow pits by inundation from high spring river flows, but population development would be dependent upon population development of lower members of the food chain. Fish population development in the Charity Lake borrow pit area would not progress at the same rate as other areas due to infrequent river flooding. Fish population establishment in this area would be dependent upon a hydraulic connection to Charity Lake. Suitable spawning areas

FINAL ENVIRONMENTAL IMPACT STATEMENT

LOUISIANA STATE PENITENTIARY LEVEE

MISSISSIPPI RIVER

WEST FELICIANA PARISH, LOUISIANA

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS, LOUISIANA

JANUARY 1982

<p>1. The project is a levee system for the Louisiana State Penitentiary, located in West Feliciana Parish, Louisiana. The project is a part of the Mississippi River levee system.</p> <p>2. The project is a part of the Mississippi River levee system. The project is a part of the Mississippi River levee system.</p> <p>3. The project is a part of the Mississippi River levee system. The project is a part of the Mississippi River levee system.</p> <p>4. The project is a part of the Mississippi River levee system. The project is a part of the Mississippi River levee system.</p> <p>5. The project is a part of the Mississippi River levee system. The project is a part of the Mississippi River levee system.</p>	<p>6. The project is a part of the Mississippi River levee system. The project is a part of the Mississippi River levee system.</p> <p>7. The project is a part of the Mississippi River levee system. The project is a part of the Mississippi River levee system.</p> <p>8. The project is a part of the Mississippi River levee system. The project is a part of the Mississippi River levee system.</p> <p>9. The project is a part of the Mississippi River levee system. The project is a part of the Mississippi River levee system.</p> <p>10. The project is a part of the Mississippi River levee system. The project is a part of the Mississippi River levee system.</p>
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Recreational Resources. The borrow areas created during project construction would afford some additional recreational potential for fishing. When the eventual overbank flooding by the Mississippi River occurs, a natural restocking process will supply and rejuvenate these borrow areas with native game fish and rough fish species. The future occasional use of the borrow areas by the Louisiana State Penitentiary employees and their dependents is forecasted to be minimal.

Agricultural Land Resources. This plan would result in beneficial impacts through the prevention of a levee crevasse to the mainline levee and the resulting inundation of approximately 9,240 acres of prime and unique farmlands. This action would further insure the preservation and continual utilization of these highly productive agricultural lands. A comparatively insignificant number of cropland acres would receive adverse impacts in areas where landside levee enlargement and seepage berms are required. These changes of farmland to levee and seepage berms still have a potential of pastureland usage causing the impacts to be even smaller. Riverside borrow excavation would also convert 266 acres of agricultural lands, which are used primarily as pasturelands and are not classified as prime farmland, to borrow pits. This would constitute a total loss of these lands to agricultural production.

Cultural Resources. This plan would not affect any cultural resources presently listed on the National Register of Historic Places. Because of its proximity to the confluence of the Mississippi and Red Rivers, the study area has been an advantageous location for trade, settlement or encampment through time. During the Civil War, Tunica Bend and Raccourci Island were sites of several small naval encounters. Late 19th century Mississippi River Commission maps identify the present penitentiary grounds as Angola Plantation. It is expected that additional sites exist along the base of the hill line, along Davis, Bobs, and Loch Lomond Bayous, and on natural levees adjacent to relict Mississippi River channels such as Charity Lake, Sugar Lake, and Lake Killarney. An intensive cultural resources survey of the proposed impact zone will be conducted during advanced feasibility studies (Phase I AE&D). The impact

1. SUMMARY

1.1 MAJOR CONCLUSIONS AND FINDINGS

The purpose of this study was to determine the most suitable plan for reducing flood damages to the Louisiana State Penitentiary and avoiding adverse social impacts while safeguarding the environment. Plan A has been designated as the National Economic Development (NED) Plan. This designation is based on the fact that it would provide the maximum average annual excess benefits over cost. Neither Plan A nor Plan A1 would make positive contributions to the environmental quality account, although both plans would create additional aquatic habitat through excavation of new borrow pits. However, Plan A1 would result in significantly less environmental degradation than Plan A. Thus, the comparative reduction in adverse impacts to forest resources and the important wildlife habitat which it would provide are the basis for the designation of Plan A1 as the Least Environmentally Damaging (LED) Plan. Both Plan A and Plan A1 would provide the same amount of flood protection with Plan A providing more average annual excess benefits over cost than Plan A1. But from an overall standpoint, the minor increases in cost associated with Plan A-1 would be small when compared to the adverse environmental impacts that would accompany Plan A. Therefore, Plan A-1 was selected for recommendation. Both of these plans propose locating actions within the flood plain, which is contrary to the intent of Executive Order 11988 which tends to discourage development within flood plains. However, these plans consist of modifications of an existing structure already within the flood plain instead of initial actions or development within the flood plain. This fact, together with the strong social resistance of the citizenry of the state to prisoner relocation, mandates that there is no practical alternative to retaining this action within the flood plain. Protection and minimization of impacts upon wetlands as proposed in Executive Order 11990 was considered in plan formulation. Both of these alternatives propose actions which

corridor appears to follow a relict 19th century river course. If sites are located within this corridor, it is expected that the majority will be historic and may include buried shipwrecks.

SOCIAL WELL-BEING IMPACTS

Plan A would have significant effects on social well-being in the study area as well as the State of Louisiana as a whole. The evacuation of the prisoners would cause undue hardship to both residents surrounding the prison as well as to residents of areas to which the prisoners would be transferred. The implementation of this plan would serve to alleviate the risk of evacuating the prisoners, thereby producing a favorable affect on the social well-being of the area as a whole.

REGIONAL DEVELOPMENT IMPACTS

The induced development effected by plan A would be the utilization of the underemployed labor potential that is located in the study area. Project construction and maintenance operations would provide minor increases in real income and income distribution.

EVALUATION AND TRADE-OFF ANALYSIS

Plan A fulfills the primary planning objectives of reducing flood damages and associated adverse social impacts for the penal farm. The estimated first cost is \$17,938,000. The benefit-to-cost ratio is 1.40 and the excess average annual benefits over cost are \$601,000, the higher of the two plans.

Plan A also complies with some of the environmental quality objectives in that it creates aquatic habitat.

From an overall standpoint, plan A is the most economical plan for providing increased flood protection for the study area. The plan is implementable and acceptable.

would adversely impact wetlands to some degree. The LED Plan, however, would result in negligible impacts to wetlands and, therefore, would be more responsive to the concept of wetland protection. A Section 404(b)(1) Evaluation is not required with the implementation of Plan A1 since the only alteration to any form of wetland would be the construction of temporary haul roads across borrow pits. These roads would be removed after construction. This exception is provided for under Section 404(f) of the Clean Water Act.

1.2 AREA OF CONTROVERSY

No controversy requiring resolution occurred during this stage of the study.

1.3 UNRESOLVED ISSUES

There are no unresolved issues in this study.

IMPLEMENTATION RESPONSIBILITIES

COST ALLOCATIONS

All costs for the construction and maintenance of plan A would be allocated to flood control.

COST APPORTIONMENT

Under traditional cost-sharing policies of the 1936 Flood Control Act the total first cost of \$17,938,000 would be apportioned \$16,779,000

Adverse environmental impacts would be minimized in this plan. Levee enlargement would be done to the landside of the existing levee where existing borrow pits abut the levee so as not to place any fill material in the borrow pits. The fill material would be taken from new borrow pits (10 feet by 285 feet by 10 miles long) parallel to the

NOTES: The compliance categories assigned in paragraph 1.4 are based on the following definitions:

a. Full compliance - Having met all requirements of the statute, E.O., or other environmental requirements for the current stage of planning (either pre or post authorization).

b. Partial compliance - Not having met some of the requirements that normally are met in the current stage of planning.

c. Noncompliance - Violation of a requirement of the statute, E.O., or other environmental requirement.

d. Not Applicable - No requirements for the statute, E.O., or other environmental requirement for the current stage of planning.

*The Agency's responsibility to inventory and assess all sites within the right-of-way and to evaluate study impacts on all such sites will be fulfilled during the Phase I General Design Memorandum stage with implementation of an intensive survey.

ENVIRONMENTAL IMPACTS

Water Bodies and Associated Wetlands. This plan would result in direct impacts to approximately 1 acre of open water and wetland. These impacts would result from the introduction of fill material into the existing borrow pits to serve as haul roads across these areas. A Section 404(b) evaluation would not be required for this plan. As with plan A, it is eligible for exemption under Section 404(f). The impacts of this plan upon the water quality of the Mississippi River would be insignificant. The destruction of wetland areas as required by haul road construction would result in the same kinds of impacts to terrestrial and aquatic species as listed for the other plan; however, the extent of the impacts would be greatly reduced.

Bottomland Hardwoods and Associated Forests. This plan would result in comparatively minimal impacts to forested areas. As indicated in the plan description, destruction to forested areas would be avoided, with limitations, with this plan. However, required haul roads through wooded areas would result in the destruction of approximately 5 acres of forest. The kinds of impacts upon forests would be the same with this plan as with plan A; however, the quantity of impacts would be greatly reduced.

Fishery Resources. This plan would require the excavation of the same amount of borrow material and would result in the creation of the same amount of aquatic habitat as would plan A. Impacts to fishery resources resulting from the implementation of the plan would be the same as with plan A.

Wildlife Resources. This plan would result in comparatively less severe impacts to terrestrial wildlife resources than would implementation of plan A. Approximately 5 acres of woodlands would be destroyed with this plan. As mentioned previously, destruction or displacement of wildlife species occupying that habitat would occur. Destruction is more probable since carrying capacities of adjacent woodlands would probably remain the

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same. Borrow pit excavation would also result in the creation of 345 acres of aquatic habitat with this plan providing the same benefits to wildlife as described previously. However, the conversion of 345 acres of open land to aquatic habitat would result in a corresponding loss to wildlife occupying open land habitat.

Threatened and Endangered Species. The implementation of this plan would, overall, provide beneficial impacts to endangered species within the study area. Impacts resulting from this plan would be practically identical to those resulting from plan A. The same amount of American alligator habitat would be created with the implementation of plan A1 as with the implementation of plan A. Habitat values initially would be low, but would increase with time as described for plan A.

Audubon Society Blue List. Implementation of plan A1 would not significantly affect any species of bird on the 1981 blue list. Since less forest area would be destroyed by plan A1 than plan A, plan A1 would severely impact fewer species.

Recreational Resources. Implementation of this plan would afford some additional recreational potential for fishing in the new borrow areas. Impacts would be minimal as for plan A.

Agricultural Land Resources. This plan would result in the same beneficial and adverse impacts to all lands within the mainline levee as plan A. However, borrow excavation in agricultural lands used as pasturelands outside the levee would convert 345 acres of these lands to borrow pits. This action would constitute a total loss of these lands to agricultural production.

Cultural Resources. This plan would result in the same impacts as in plan A with the same additional studies being conducted after authorization.

3. NEED FOR AND OBJECTIVES OF STUDY

3.1 STUDY AUTHORITY

The study was authorized by a resolution of the Committee on Public Works of the United States Senate, adopted on 5 September 1973 at the request of Senator Russell B. Long of Louisiana. The resolution reads as follows:

RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Chief of Engineers, Department of the Army, is hereby requested to review the report on the Mississippi River and Tributaries Project, published as House Document 308 of the Eighty-eighth Congress, and other pertinent reports, with a view to determining whether incorporating the local levee at the Louisiana State Penitentiary into the Federal levee system is advisable.

3.2 PUBLIC CONCERNS

The existing levee is deficient in both grade and cross-section. These inadequacies make failure a possibility during high-water season. In the event of failure or the threat of failure, evacuation of the inmate population would be necessary. Finding an alternate location for the prisoners would pose a formidable problem. The area also has seepage and interior drainage problems which can be detrimental to the crops inside the levee system during high water. At the initial public meeting (22 April 1976), it was requested that the Angola levee be incorporated into the Federal levee system, the maximum justifiable land area be protected, adequate interior drainage facilities be provided, and an access road between the ferry landing and the penitentiary be constructed. At the final public meeting, the request for an access road was repeated. Concern was also expressed over the possible effect the

SOCIAL WELL-BEING IMPACTS

Plan A1 would have significant effects on social well-being in the study area as well as the State of Louisiana as a whole. The evacuation of the prisoners would cause undue hardship to residents surrounding the prison as well as to residents of areas to which the prisoners would be transferred. The implementation of this plan would serve to alleviate the risk of evacuating the prisoners, thereby producing a favorable affect on the social well-being of the area as a whole.

REGIONAL DEVELOPMENT IMPACTS

The induced development effected by plan A1 would be the utilization of the underemployed labor potential that is located in the study area. Project construction and maintenance operations would provide minor increases in real income and income distribution.

EVALUATION AND TRADE-OFF ANALYSIS

Plan A1 fulfills the primary planning objectives of reducing flood damages and associated adverse social impacts for the penal farm. The estimated first cost is \$18,274,000, which is somewhat higher than plan A. The benefit-to-cost ratio is 1.38 and the excess average annual benefits over costs are \$574,000 which is only slightly less than plan A.

Of all plans considered, plan A1 most closely meets the primary planning and environmental quality objectives in that it minimizes adverse environmental impacts as much as possible. It is also implementable and acceptable to all who are concerned.

higher levee may have on local drainage in the northeast corner. The need to provide an adequate level of flood protection for the Angola area, while minimizing adverse environmental impacts, is the major problem to be addressed in this study. The adverse social impact associated with the relocation of the inmate population in the event of a levee failure is a problem inherent in meeting the basic objective of the authorizing resolution. An access road is unrelated to flood control or the authorizing resolution, and the expenditure of funds for such construction is not a Corps of Engineers water resource planning function. Therefore, this request could not be addressed in the study. However, the inclusion of such a road in the design to be constructed at non-Federal expense will be considered in the advanced engineering and design phase. The local drainage problem will be addressed at that time also.

3.3 PLANNING OBJECTIVES

The goals of this planning effort were to reduce flood damages at the Louisiana State Penitentiary and associated adverse social impacts in the state, to preserve the remaining bottomland hardwoods in the study area, and to create or enhance existing wildlife habitat.

IMPLEMENTATION RESPONSIBILITIES

COST ALLOCATIONS

All costs for the construction and maintenance of plan A1 would be allocated to flood control.

COST APPORTIONMENT

Under traditional cost-sharing policies the total first cost of \$18,274,000 would be apportioned \$17,115,000 to the Federal Government and \$1,159,000 to non-Federal interests. The non-Federal portion of the first cost would be the cost of all lands, easements, rights-of-way, and relocations. All of the estimated operation and maintenance costs of \$14,000 would be borne by the non-Federal interests.

COMPARISON OF DETAILED PLANS

Comparative information on the detailed plans is presented in subsequent paragraphs along with the rationale for designating one of the plans as the national economic development plan, one as the least environmentally damaging plan and one as the recommended plan.

The two plans considered in detail were structural plans. All feasible nonstructural measures are already part of the without-project condition; i.e., the nonstructural plan is the same as the no action plan. This plan does not respond to the planning objectives.

Both of the plans considered in detail would comply with the primary planning objectives of reducing flood damages and associated adverse social impacts. Both plans are economically justified, but plan A is less costly and provides higher average annual excess benefits over costs than plan A1. Plan A1 includes provisions to avoid woodland and wetland areas when digging the borrow pits.

4. ALTERNATIVES

4.1 PLANS ELIMINATED FROM FURTHER STUDY

4.1.1 Plan B. This plan combined the improvements to the mainline levee (minus reach between stations 148+81 and 290+00) discussed in Plan A, as described in detailed plans below, with improvements to the Monkey Island levee to the same design level of protection. (See Plate 1 for the general location of all plans eliminated from further study). Raising and strengthening the Monkey Island levee would be done in conjunction with either seepage berms or relief wells. The new levee would be built to the same specifications as the mainline levee. A drainage structure and pumping station would be installed at levee station 153+00 Monkey Island levee.

4.1.2 Plan C. In addition to the improvements in Plan A (minus reach between mainline levee stations 293+00 and 448+00), this plan would include the raising and strengthening of the Charity Lake levee to the same design level of protection. Improvements to Charity Lake levee would be done in conjunction with either relief wells or seepage berms. This levee would be built to the same specifications as the mainline levee. The existing gravity outlet structure for this area would be replaced with a new structure and pumping station at levee station 10+00 Charity Lake levee.

4.1.3 Plan D. This plan provided for raising and strengthening the mainline (minus reach between stations 148+81 and 448+00), Monkey Island, and Charity Lake levees to the maximum height of 71.5 feet National Geodetic Vertical Datum (NGVD).¹ All the elements, including levee size

¹All elevations and stages used in this report refer to the National Geodetic Vertical Datum (NGVD) unless otherwise noted (formerly mean sea level).

Table B-3 summarizes the first costs, annual charges, benefits and benefit-cost ratios for the two detailed plans. Detailed estimates of first costs are shown in table C-5. A summary comparison of the plans is shown in table B-4.

RATIONALE FOR NATIONAL ECONOMIC DEVELOPMENT PLAN

Plan A would provide the maximum average annual excess benefits over costs and therefore, was designated the national economic development plan.

TABLE B-3--FIRST COST AND ANNUAL CHARGES--DETAILED LEVEE PLANS
(October 1980 price levels; 7 3/8 percent interest rate)

	<u>Plan A</u>	<u>Plan A1</u>
	<u>(\$)</u>	<u>(\$)</u>
<u>First Cost</u>		
Lands	1,159,000	1,159,000
Construction	11,985,000	12,225,000
Contingencies	2,996,000	3,056,000
Engineering and Design	899,000	917,000
Supervision and Administration	<u>899,000</u>	<u>917,000</u>
Total First Cost	17,938,000	18,274,000
Present Value of Investment	19,971,000	20,345,000
<u>Annual Charge</u>		
Interest and Amortization	1,474,000	1,501,000
Operation, Maintenance, and Replacement	<u>14,000</u>	<u>14,000</u>
Total Annual Charges	1,488,000	1,515,000
Total Annual Benefits	2,089,000	2,089,000
Net Benefits	601,000	574,000
Benefit-Cost Ratio	1.40	1.38

and drainage structures discussed in Plans A, B, and C, would be incorporated into this plan.

4.1.4 Plan E. This plan called for improving the mainline levee as in Plan A, while raising the Monkey Island levee to 61 feet which would provide approximately 10-year flood protection. Levee specifications for this levee, except for height, would be the same as that proposed for full protection. Improvements to the levee would be done in conjunction with seepage berms. New drainage structures would be identical to those described for Plans A and B.

4.1.5 Plan F. This plan would combine raising and strengthening the Charity Lake levee to provide 10-year protection (maximum height 61 feet) with the improvements to the mainline levee discussed in Plan A. Levee design would be identical to that for the mainline levee except for height. Improvements to the levee would be done in conjunction with seepage berms. New drainage structures would be the same as those described in Plans A and C.

4.1.6 Plan G. This plan combined raising and strengthening the mainline levee as discussed in Plan A, while upgrading the Monkey Island levee and Charity Lake levee to provide 10-year protection. All the elements of Plans A, E, and F were incorporated into this plan.

4.1.7 Screening. Two of these plans (C and F) in addition to Plan A have positive net benefits and an overall benefit-to-cost ratio greater than 1. However, the incremental benefit-to-cost ratios for Plans B through G when compared to Plan A are all less than unity. Therefore, it is not economically justified to provide increased flood protection to the outlying areas. These plans would also result in more adverse environmental impacts than Plan A.

TABLE B-4--SUMMARY COMPARISON OF ALTERNATIVE PLANS

ITEM	PLAN A (NED)		PLAN A1 (LED, Tentatively Recommended Plan)		NO ACTION (Nonstructural Plan)	
	PLAN A (NED)		PLAN A1 (LED, Tentatively Recommended Plan)		NO ACTION (Nonstructural Plan)	
I. PLAN DESCRIPTION	This plan would increase flood protection to agriculture, structures and contents, and reduce the likelihood of inmate evacuation and subsistence costs. The mainline levee would be raised and strengthened to a maximum height of 71.5 NGVD from its present height of 63 NGVD.		This plan provides the same level of protection as plan A; however, environmentally mitigating measures were added to make this plan the least damaging environment-ally. Borrow pit excavation will avoid wooded areas and the wetland areas contiguous to Charity Lake and Sugar Lake.		No action would subject residents to the threat of a levee crevasse. Potential losses to agriculture and to structures and contents would remain high. The no action plan incorporates nonstructural measures that now exist or are expected to be in existence in the future without any Federal action; that is a combination of flood-forecasting coupled with flood-fighting and evacuation.	
II. SIGNIFICANT IMPACTS						
1. National Economic Development (NED)						
a. Total average annual benefits	\$2,089,000 (a,1,2,3,6,9)		\$2,089,000 (a,1,2,3,6,9)		0	
b. Total average annual costs	\$1,488,000		\$1,515,000		0	
1) Interest and amortization	\$1,474,000		\$1,501,000		0	
2) Operation and maintenance	\$14,000		\$14,000		0	
c. First Cost	\$17,938,000		\$18,274,000		0	
d. Net annual NED benefits	\$601,000 (a,1,2,3,6,9)		\$574,000 (a,1,2,3,6,9)		0	
e. Benefit-cost ratio	1.40		1.38			

4.2 WITHOUT CONDITIONS

4.2.1 General. The State of Louisiana currently employs various measures to protect the residents of the penitentiary at Angola. These are flood-forecasting, flood-fighting, evacuation planning, and levee renovation planning. Flood-forecasting for the Mississippi River is adequate. Flood-fighting begins at a flood stage of approximately 56 feet which has a frequency of occurrence of once every 8 years. Evacuation would become necessary for flood stages in excess of 60 feet and subsequently relocation of prisoners would be required. The duration of relocation would be dependent upon the occurrence, or lack of occurrence, of a levee crevasse. The social aspects of relocation of inmates would not be limited to Angola and the relocation areas, but would also occur in other areas of the state since public sentiment is strongly against the relocation of criminal elements. Levee renovation planning is being conducted by the Louisiana Department of Public Works, however, priorities have not resulted in funding for this project.

4.2.2 Nonstructural Plan. The no action plan is also considered to be the nonstructural plan. The primary objective of providing adequate flood protection to the penitentiary area while safeguarding and enhancing the environment would not be accomplished by this plan. The social impacts of prisoner evacuation and temporary relocation would provide strong resistance to the acceptability of this plan. Detailed information on inmate evacuation and relocation are discussed in Appendix E.

4.3 PLANS CONSIDERED IN DETAIL

4.3.1 Plan A (NED). This plan (Plate 3) consists of raising and strengthening the mainline levee to a maximum height of 71.5 feet by levee enlargement of the riverside or landside with seepage berms where seepage has been observed. The levee would have a 10-foot crown with side slopes of 1 vertical on 5.5 horizontal on the landside and 1 vertical on 4 horizontal on the riverside. Existing and proposed levee cross-sections are shown on Plates C-3 and C-4. This would provide protection

TABLE B-4--SUMMARY COMPARISON OF ALTERNATIVE PLANS (Continued)

ITEM	PLAN A (NED)	PLAN A1 (LED, Tentatively Recommended Plan)	NO ACTION (Nonstructural Plan)
2. Environmental Quality	Three hundred forty-five acres of land would be used for borrow excavation and for haul roads, including 71 acres of woodlands, 10 acres of wetlands and open water, and 266 acres of open land. (a,1,6,9)	Environmental and water quality impacts are less than plan A. Approximately 5 acres of woodlands, 1 acre of open water, wetland, and 345 acres of open land would be affected. (a,1,6,9)	The 700 acres of wetlands and open water presently in the study area would remain the same with no action. (a,1,2,3,5,9)
3. Social Well-Being			
a. Redevelopment* and effects on distribution of real income	Increased employment and income opportunities to middle and lower income families. (1,2,3,6,9)	Similar to plan A. (Slightly greater)	None.
b. Injurious displacement of peoples* and community disruption	Plan reduces likelihood of levee crevasse and the economic and social upheaval associated therewith. (1,2,3,6,8,9)	Same as plan A.	Area is subject to possible crevasse and attending disruption.
4. Regional Development			
a. Effects on employment and income	Additional employment and income. (1,2,3,6,9)	Similar to plan A. (Slightly greater)	None.
b. Other effects	Not evaluated.	Not evaluated.	Not evaluated.

from the Project Design Flood (PDF) with 4 feet of freeboard. Included in this plan is the replacement of the existing 6- by 6-foot concrete culverts with two new 6- by 6-foot concrete culverts with sliding vertical sluice gates. The new culverts would be 290 feet long with stop logs at either end for secondary closure. No change would be made to the three existing electrical pumps which have a total pumping capacity of 120,000 gallons per minute (gpm). The water is pumped over the levee through two 36-inch diameter cast iron pipes. These pipes would need to be modified in their length so that they would pass over the top of the new levee. Levee enlargement would be done to the landside of the existing levee where existing borrow pits abut the levee. The fill material would be taken from new borrow pits on the riverside of the existing mainline levee with average dimensions of 10 feet deep by 285 feet wide by about 10 miles in length and located parallel to the levee. The distance from the riverside toe of the improved levee to the borrow pits would be approximately 450 feet. Implementation of this plan is as indicated in Table 4.3.3.

4.3.2 Plan A1 (LED and Recommended Plan). This plan (Plate 4) consists of raising and strengthening the mainline levee to the same specifications as in Plan A. Adverse environmental impacts would be minimized in this plan. Levee enlargement would be done to the landside of the existing levee where existing floodside borrow pits abut the levee in order to avoid placement of fill material in existing borrow pits. The fill material would be taken from new borrow pits (10 feet deep by 285 feet wide by 10 miles long) generally parallel to the riverside of the levee. The distance from the riverside toe of the enlarged levee to the borrow pits would be approximately 450 feet. Significant forested areas and wetlands contiguous to Charity Lake and Sugar Lake would be avoided by borrow excavation being confined to open, nonwetland areas as indicated on Plate 4. The construction of haul roads from the new borrow pits would also be done in such a way that wetlands and existing borrow pits hydrologically connected to Charity or Sugar Lakes would not be significantly affected by the placement of fill material. Implementation and responsibility are presented in Table 4.3.3.

INDEX OF FOOTNOTES

*Items specifically mentioned in Section 122 of Public Law 611, 91st Congress.

a) Impact occurs within study area.

b) Impact occurs within the rest of Nation.

Timing

1) Impact is expected to occur prior to or during plan implementation.

2) Impact is expected within 15 years following plan implementation.

3) Impact is expected in longer time-frame (15 or more years following implementation).

Uncertainty

4) The uncertainty associated with the impact is 50 percent or more.

5) The uncertainty is between 10 percent and 50 percent.

6) The uncertainty is less than 10 percent.

Exclusivity

7) Overlapping entry; fully monetized in NED account.

8) Overlapping entry; not fully monetized in NED account.

Actuality

9) Impact will occur with implementation.

10) Impact will occur only when specific additional actions are carried out during implementation.

11) Impact will not occur because necessary additional actions are lacking.

1/ Costs and benefits are computed at October 1980 price levels, a 7 3/8 percent interest rate, and a 100-year project life.

TABLE 4.3.3 - IMPLEMENTATION AND RESPONSIBILITY

	PLAN A	PLAN A1
(October 1980 price levels; 7 3/8 percent interest rate)		
1. Traditional		
a. First Cost		
(1) Federal	\$16,779,000	\$17,115,000
(2) Non-Federal	1,159,000	1,159,000
(3) Total	17,938,000	18,274,000
b. Annual Cost		
(1) Federal	1,377,000	1,404,000
(2) Non-Federal	111,000	111,000
(3) Total	1,488,000	1,515,000

RATIONALE FOR LEAST ENVIRONMENTALLY DAMAGING PLAN

The impacts of the detailed plans on wooded and wetland areas was the primary consideration in the designation of the least environmentally damaging plan. Plan A1 includes provisions to avoid these critical areas. Plans A and A1 both create the same amount of open water through the digging of the borrow pits which will provide for more aquatic habitat. Plan A1 would be more desirable from an environmental standpoint than plan A and was therefore designated the least environmentally damaging plan.

RATIONALE FOR RECOMMENDED PLAN

Both plans provide the same amount of flood protection although plan A would provide approximately \$28,000 more average annual excess benefits over costs than plan A1.

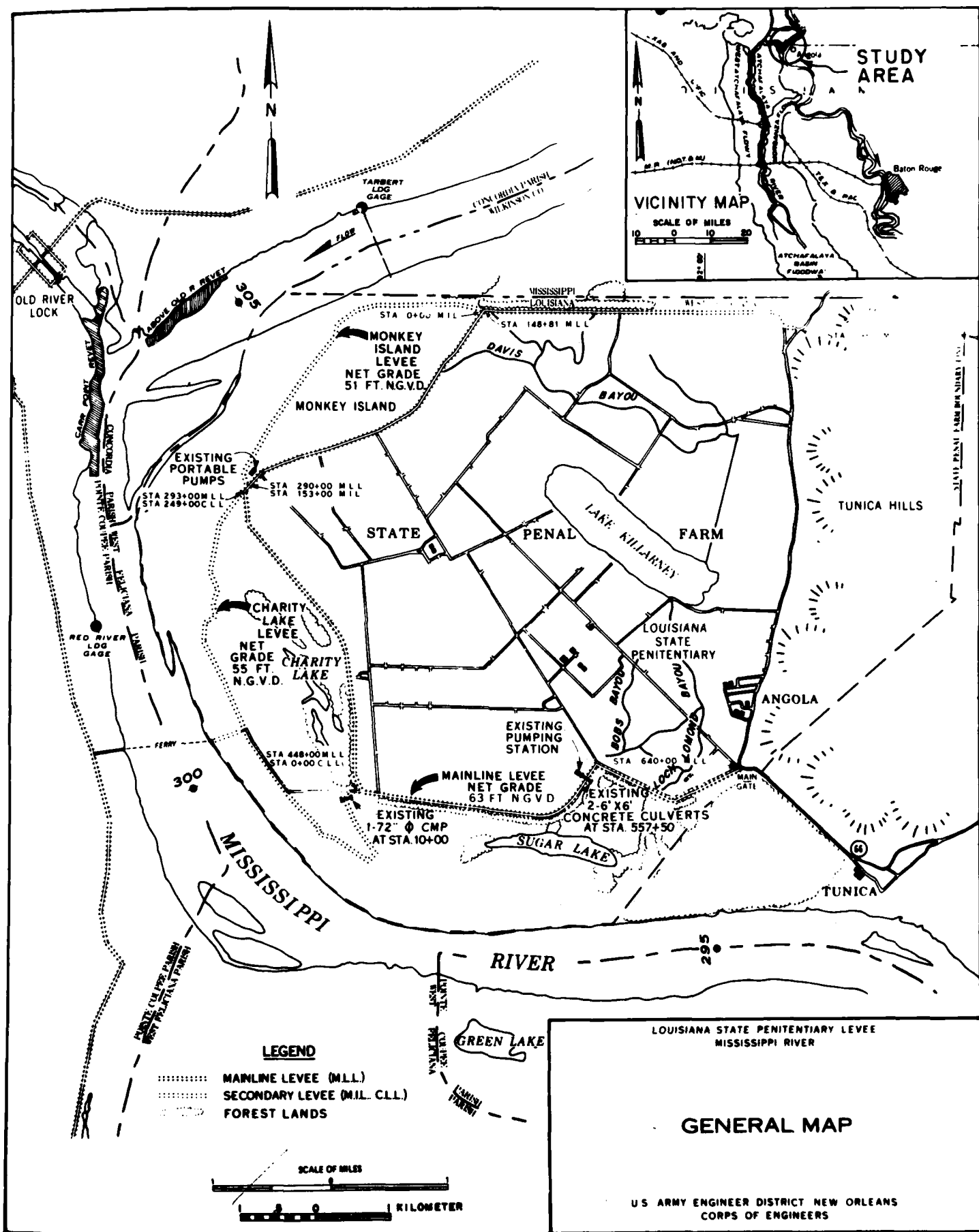
Plan A1 is more costly than plan A by a relatively small amount, but plan A1's environmental impacts would be less than plan A's due to its greater avoidance of wooded and wetland areas.

From an overall standpoint the minor increases in cost associated with plan A1 are small when compared to the adverse environmental impacts that would accompany plan A. Therefore, plan A1 is selected for recommendation. Table B-5 summarizes the benefits and costs for the recommended plan at 7 5/8 percent interest and October 1981 price levels.

5. AFFECTED ENVIRONMENT

5.1 ENVIRONMENTAL CONDITIONS

The study area consists of the entire Louisiana State Penitentiary at Angola; however, the area of most concern is that part of the penitentiary within the Mississippi Alluvial Plain. Non-Federal levees protect most of this area from Mississippi River floods (see Plate 1). The majority of the land is agricultural with ground surface elevations ranging from 40 to 55 feet. A portion of the adjacent Tunica Hills drains into Lake Killarney, a large oxbow on the penal farm which also serves as a reservoir for this area. Although the native forest type in this area is bottomland hardwoods, practically the entire area within the mainline levee has been cleared. Approximately 1,370 acres of bottomland hardwood forests and earlier stage riverine forests of varying wildlife value are found outside the mainline levee. Seven hundred acres of water bodies and associated wetlands provide habitat for fishes and aquatic-dependent forms of terrestrial wildlife. A description of the fish and wildlife habitat is provided in the Fish and Wildlife Coordination Act Report included in Appendix D. Aboriginal and historic occupation of the Angola area has been intense, which makes this area one of the more culturally significant areas of the state. There are several archeological sites in the study area containing artifacts from prehistoric times. Recreation which occurs in the study area is minimal and considered nonsignificant due to the nature of the facility. Approximately 16,240 acres of the 19,428 acres in the study area are subject to potential Mississippi River overflow. Of the area subject to overflow, about 4,100 acres located adjacent to the river are unprotected and largely undeveloped. The remaining 12,140 acres are partially protected by the levee system. Within the mainline levee, about 4,850 acres are used for pastureland and 4,390 acres are used for croplands. The net annual return on these lands is \$859,000 (1980 price levels). Transportation routes into the study area include a ferry crossing on the

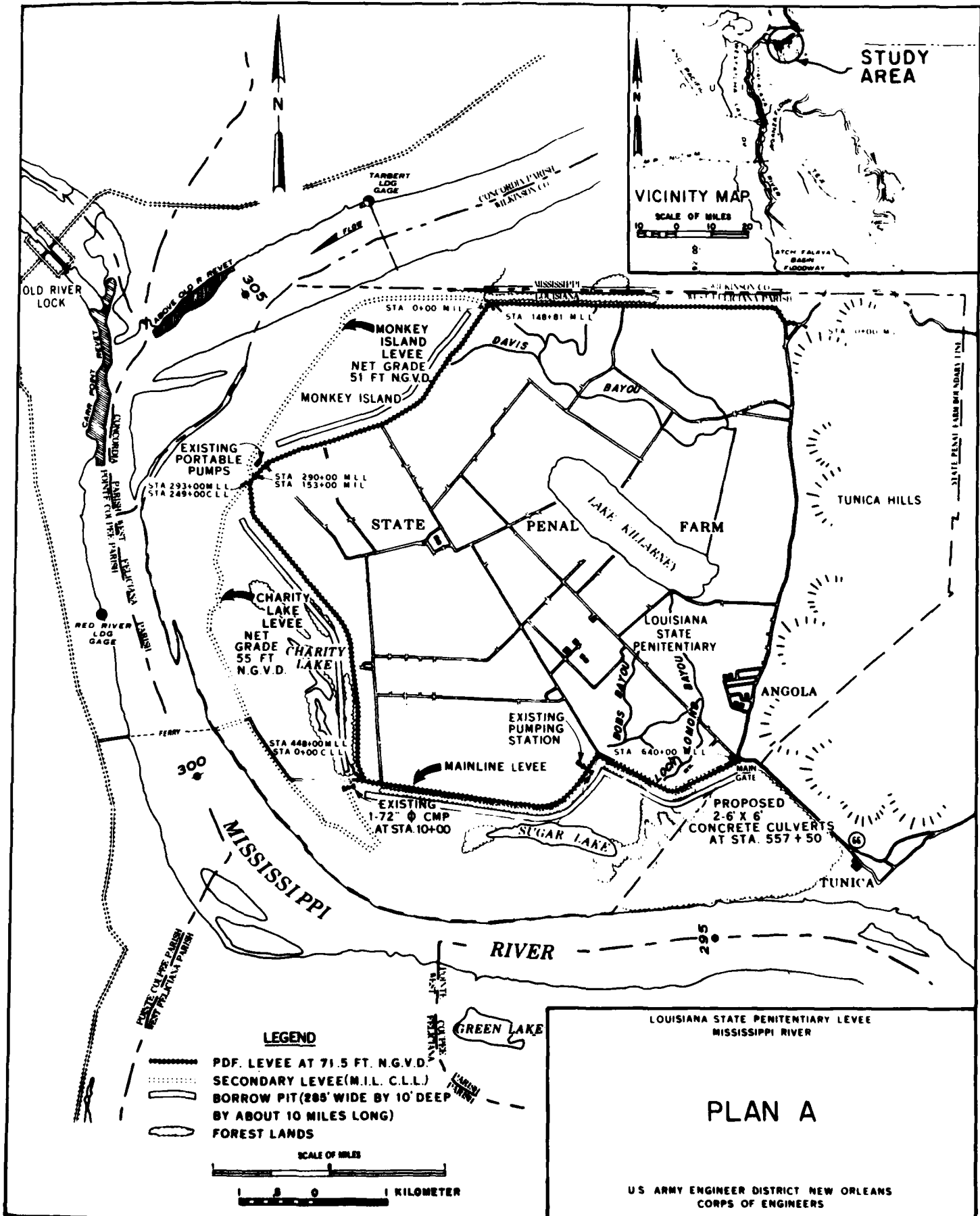


Mississippi River near mile 300.5 above Head of Passes, Louisiana Highway 66 southeast from Tunica, Louisiana, and an unnumbered rural road from the northeast that connects with Highway 66.

5.2 SIGNIFICANT RESOURCES

5.2.1 Agricultural Lands. The penitentiary contains approximately 14,170 acres of land which are considered to be agricultural lands. Of these, 2,274 acres are within the Charity Lake and Monkey Island levees. Approximately 4,100 acres are located outside the levee system. The remaining 9,240 acres are within the mainline levee. The unprotected acres and the Charity Lake and Monkey Island areas are used primarily for pastureland. The lands within the mainline levee consist of 4,850 acres of pasture, 3,500 acres of soybeans, 540 acres in cotton, 350 acres in corn, and a few acres in vegetables. The pastureland within the mainline levee is located in the northeast part of the compound and around Lake Killarney. The rest of the compound is interspersed with fields of the various row crops. The entire acreage of lands within the mainline levee is classified as prime farmland. Since sugarcane has been grown on this area, it is also classified as unique farmland. As described by the Council on Environmental Quality, prime farmlands are those whose value derives from their general advantage as cropland due to soil and water conditions. Unique farmlands are those whose value derives from their particular advantage for growing specialty crops. These agricultural lands are significant because they constitute the most important resource through which the prison management attempts to achieve a self-sufficient economic position and, subsequently, a reduced burden upon the Louisiana taxpayer.

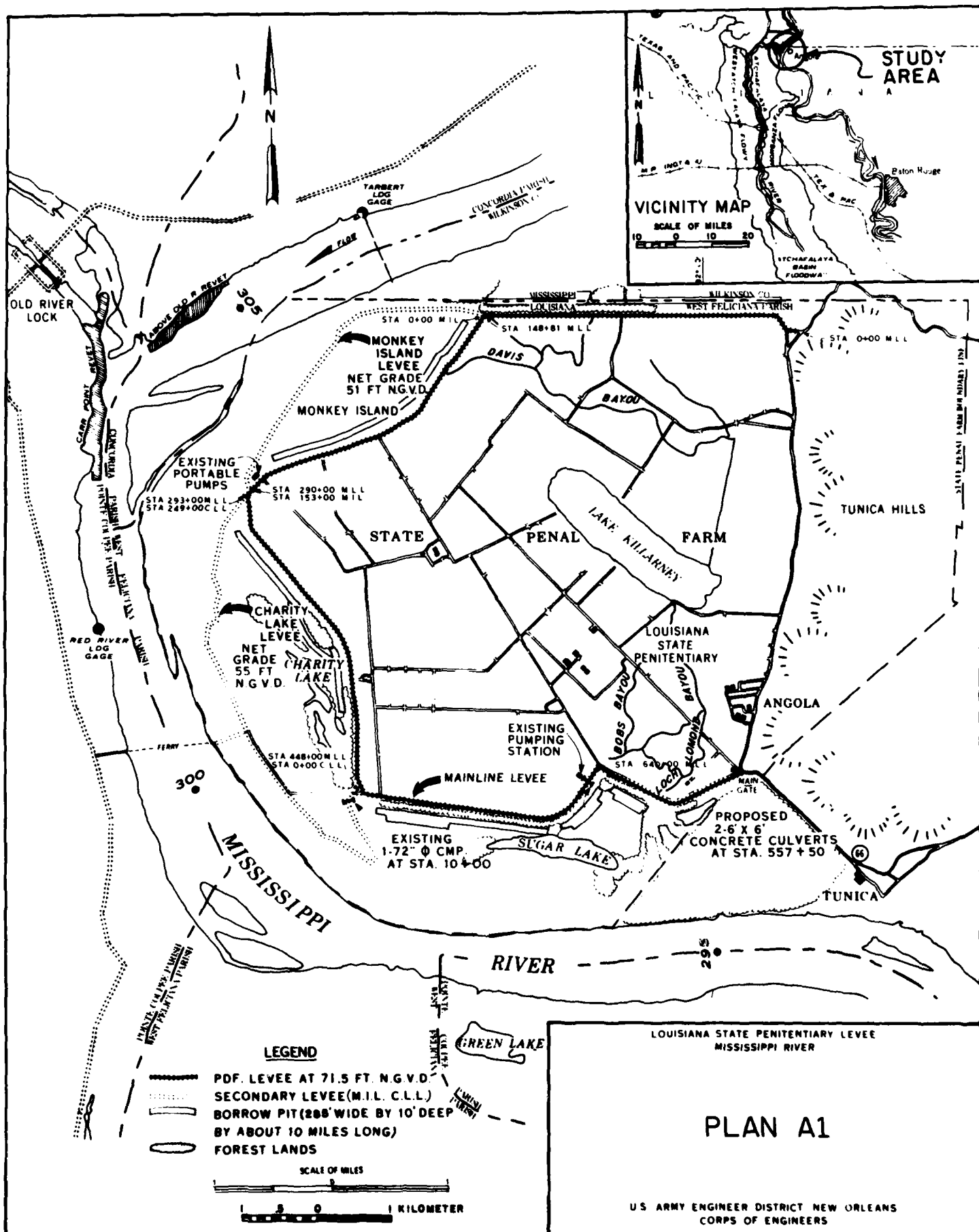
5.2.2 Prison Facilities. Prison facilities are located almost entirely within the mainline levee. The penitentiary buildings include dormitories, messhalls, workshops, a hospital, stores, schools, and administration buildings (Plate 2). There are also a number of storage buildings and support facilities such as the laundries and power plants, plus residential structures for staff personnel. The prison facilities



are divided into a main compound and several self-supporting subcamps. The value of all these structural facilities is \$142,000,000 (1980 price levels) excluding the value of contents which is estimated at \$22,000,000. In addition, there are 27 miles of bituminous paved roads and 73 miles of gravel farm roads that have a replacement value of \$5,400,000.

5.2.3 National Register of Historic Places. The National Register of Historic Places, as published in yearly and monthly supplements of the Federal Register, was consulted through 23 June 1981. The closest National Register property to the project is Trudeau Landing, east of the community of Tunica, Louisiana. It is well outside the study boundaries and would not be affected by the proposed levee improvements. Known sites in the project area which are not National Register properties include at least five prehistoric, protohistoric, and historic sites (16WF14, 15, 16, 21, and 28) located on the bluff overlooking the penitentiary. Site 16WF1, an historic Tunica Village, is located just south of the proposed borrow pit closest to the main gate. This site has been previously disturbed by construction of Highway 66 and the penitentiary hospital. Additional known sites within prison boundaries are 16WF3, a possible Poverty Point mound and historic cemetery just north of the main gate, and 16WF2, a probable Houma Village dating from 1680 to 1708 on the natural levee east of Lake Killarney. Because of its proximity to the confluence of the Mississippi and Red Rivers, the study area has been an advantageous location for trade, settlement, and encampment through time. During the Civil War, Tunica Bend and Raccourci Island were sites of several small naval encounters. Late 19th century Mississippi River Commission maps identify the present penitentiary grounds as Angola Plantation. It is expected, therefore, that additional sites exist along the base of the hill line, along the natural drainages, and along natural levees adjacent to relict Mississippi River channels.

5.2.4 Water Bodies and Associated Wetlands. Water bodies and wetlands in this area include the Mississippi River, tributary streams, oxbow lakes, sloughs, and wetlands. Wetlands also include existing borrow



areas that are hydrologically connected to adjacent, natural wetlands. Typical wetlands in the study area include lake and slough edges and shallow water areas which commonly support wetland plants such as cypress, swamp privet, waterelm, and buttonbush. Other wetlands include borrow pit edges and shallow water areas which support aquatic vegetation such as cypress, swamp privet, black willow, and sedges and are connected to Sugar and Charity Lakes. There are approximately 700+ acres of these resources within the boundaries of the study areas (excluding the Mississippi River). These resources are significant for several reasons. The quality of these waters affects, either beneficially or adversely, the water quality of downstream flows of the Mississippi River. The Mississippi River is classified by the Louisiana Department of Natural Resources, Division of Water Pollution Control, as suitable for secondary contact recreation, propagation of fish and wildlife, and domestic raw water supply. Secondary contact recreation includes fishing, wading, boating, etc. Concern for the water quality of the Mississippi River is important due to the dependence of the city of New Orleans upon the river as a water supply, and the contribution of water quality to the productivity of the highly significant biological resources dependent upon this river system. The open-water areas of these resources serve as habitat for numerous species of fishes as well as several water-related terrestrial species such as the endangered American alligator, various furbearers, and water birds including waterfowl and wading birds. Vector populations, primarily mosquito, also occur in these resources. Mosquito species present include: Aedes vexans, Psorophora columbiae, Psorophora ferox, Culex salinarius, Culex quinquefasciatus, Anopheles crucians, and Anopheles quadrimaculatus. The latter three species are those most commonly associated with borrow pits. The wetland portions of these resources have functions and values which have nationwide significance. Some of the most important are as follows: (1) wetlands provide important natural biological functions such as food chain production, general habitat, and nesting, spawning, rearing, and resting sites for aquatic or land species; (2) wetlands serve as valuable storage areas for storm and flood waters; and (3) wetlands serve as water purification areas. The wetlands in the study area serve all wetland functions described above, and, therefore, are significant.

5.2.5 Bottomland Hardwoods and Associated Forests. There are approximately 1,370 acres of forested lands within the study area. Native forests consist of bottomland hardwood species on older sites relatively far from the river which receive very little sediment deposition, and riverine forests on newer sites relatively close to the river which receive frequent inundation and significant sedimentation. Major bottomland hardwood species present include sweet and bitter pecan, hackberry, boxelder, and cottonwood. Swamp privet and water locust predominate in low areas. Riverine forests consist of homogenous stands of willows or willows and cottonwoods. The quality of the overall woodland area is considered to be moderate since there is intergradation of bottomland hardwoods and riverine forests throughout the wooded areas within the study area. These forests also provide value as fishery habitat when flooded. The woodlands in the area are significant due to the wildlife habitat which they provide, the potential wildlife habitat which will result from natural forest succession, the buffer effect against Mississippi River wave action, and the soil holding function provided by leaf litter, tree roots, etc.

5.2.6 Wildlife Resources. The entire study area constitutes available habitat of varied types and value for various wildlife species. Area-wide, however, the most important type present due to rapidly decreasing supplies is forest habitat. The study area provides very little forested habitat inside the mainline levee system other than around Lake Killarney. The Lake Killarney woodlands provide habitat for wetland species and those species associated with wetlands such as prothonotary warblers, various wading birds, and wood ducks. The agricultural area provides habitat primarily for species such as meadowlarks, hawks, cattle egrets, and mourning doves. Harvested cornfields provide extensive feeding areas for doves. The area outside the mainline levee system provides pastureland habitat and significant "edge" area adjacent to woodland strips, fencerows, and lakes or borrow areas. These areas provide habitat for species such as bobwhite quail, swamp and cottontail rabbits, and cardinals. Woodducks, mallards, and other species of waterfowl utilize the habitat provided by natural lakes and ponds and by borrow areas. White-tailed deer utilize forested areas and brushy areas within the study area. Sport hunting for deer,

squirrel, rabbit, bobwhite quail, and waterfowl is allowed outside the mainline levee system and is pursued actively. Doves are commonly hunted over harvested cornfields during fall and winter seasons. Hunting is allowed by permit only due to the necessity for security on the study area. Wildlife resources are significant due to the historical esthetic appreciation of abundant wildlife populations and the nationwide trend of continuous habitat destruction.

5.2.7 Fishery Resources. Habitat for fishery resources results from approximately 700 acres of previously listed water bodies and associated wetlands within the study area and the additional acreage resulting from approximately 4 miles of permanent bayous and streams. To a lesser extent that forested area which is flooded periodically also provides an undetermined amount of fishery habitat. Acreage of natural lakes and ponds is naturally expected to increase during winter and spring due to local rainfall and Mississippi River flooding. The more desirable sport fish species present in the waters of the study areas are largemouth bass, black and white crappie, catfish, and several smaller panfish species. All lakes except Lake Killarney are rejuvenated by Mississippi River flooding which occurs frequently. Sport fishing is allowed on Lake Killarney to the public with permission. Fishing on other area lakes and borrow pits is controlled more heavily and is limited to penitentiary employees and their dependents. Crawfish are harvested in suitable areas in the study area; however, productivity is dependent upon sufficient winter rainfall and lengthy winter and spring high-water conditions. Commercial fishing is done in backwater flooded areas, but is not permitted in interior lakes. Channel catfish, buffalo, freshwater drum, and gizzard shad are the most important commercial species. Fishery resources are significant due to the overall nationwide demand for quality fishing opportunities and the natural nursery functions that the waters provide.

5.2.8 Threatened and Endangered Species. The American alligator (Alligator mississippiensis) is determined as the only threatened or endangered species present within the area to be affected. The

APPENDIX C

RECOMMENDED INVESTIGATIONS

red-cockaded woodpecker [Picoides (Dendrocopos) borealis] may be present in the adjacent Tunica Hills; however, suitable habitat does not exist in the flood plain portion of the study area for this species. The American alligator, classified as endangered in this portion of Louisiana, is commonly found in oxbow lakes in this locality and has been reported in waters within the study area. Suitable habitat exists in Sugar, Charity, and Killarney Lakes, smaller natural lakes and swales, and the existing borrow pits. Alligator numbers for West Feliciana Parish have been estimated at 38 per square mile of suitable habitat. Due to the clutch size of a typical alligator nest being 35 to 40 eggs, and the proximity to the Mississippi River, actual numbers are highly speculative. Other avian endangered species may be transient through the study area, and the probability of their actual stopping over on the area is extremely low. Threatened and endangered species are significant due to the national concern for dwindling numbers of any specific species.

5.2.9 Audubon Society Blue List. The species of birds named to the Audubon Society Blue List are those which, in the opinion of Society respondents, have recently, or are currently giving evidence of population declines. Several species on this list are either transients or common inhabitants of the study area. The 1981 Blue List of those species whose range includes the study area is as follows:

1981 BLUE LIST

Common Loon	Barn Owl
Double-crested Cormorant	Common Screech Owl
Great Blue Heron	Burrowing Owl
Black-crowned Night Heron	Short-eared Owl
Least Bittern	Whip-poor-will
American Bittern	Common Nighthawk
Wood Stork	Ruby-throated Hummingbird
Black Duck	Red-headed Woodpecker
Canvasback	Hairy Woodpecker
Black Vulture	Willow Flycatcher

6. ENVIRONMENTAL EFFECTS

6.1 GENERAL This section explains narratively the data on the comparative impacts of alternatives previously presented in Table 4.4.

6.2 AGRICULTURAL LANDS

6.2.1 Plan A. This plan would result in beneficial impacts through the prevention of a levee crevasse to the mainline levee and the resulting inundation of approximately 9,240 acres of prime and unique farmlands. This action would further insure the preservation and continual utilization of these highly productive agricultural lands. A comparatively insignificant number of cropland areas would receive adverse impacts in areas where landside levee enlargement and seepage berms are required. These changes of farmland to levee and seepage berms would still have a potential of pastureland usage. Riverside borrow excavation would also convert 266 acres of agricultural lands, which are used primarily as pastureland and are not classified as prime farmland, to borrow pits. This would constitute a total loss of these lands to agricultural production.

6.2.2 Plan A1. The implementation of this plan would result in the same beneficial and adverse impacts to all lands within the mainline levee as plan A. However, borrow excavation to agricultural lands used as pasturelands outside the levee would convert 345 acres of these lands to borrow pits. This action would also constitute a total loss of these lands to normal agricultural production.

6.3 PRISON FACILITIES

6.3.1 Plan A. The implementation of this plan would provide increased flood protection for the prison which would prevent a total of \$55,000,000 (\$1,819,000 average annual) in damages to prison structures,

HYDRAULICS

The Louisiana State Penitentiary mainline levee, which is 12.1 miles long, begins at the base of the Tunica Hills in the northeast portion of the penitentiary property and connects in the vicinity of the main gate (see plate 1). The mainline levee generally provides protection to about 15.3 square miles of inclosed area from Mississippi River floodwaters to an elevation of 63 feet NGVD. The adjacent Monkey Island levee, which ties into the mainline levee, has a control grade of 51 feet NGVD and provides a degree of protection to about 1.3 square miles. The adjacent Charity Lake levee, which also ties into the mainline levee, has a control grade of 55 feet NGVD and provides a degree of protection to about 2.2 square miles.

DETAILED LEVEE PLANS (ALTERNATIVES A AND A1)

The design flood flowline would increase as a result of changes in overbank flow conditions caused by increases in levee heights associated with the implementation of plan A or plan A1. These stage increases could impact other MR&T study areas. Flowlines for existing conditions and for conditions with these plans in place were computed using the HEC-2 computer program developed by the Hydrologic Engineering Center in Davis, California. A tabulation of these computed flowlines is provided in table C-1. The results indicate that neither plan A or plan A1 will cause any significant increases in the design flowline. Therefore, the operation of Old River control structure and/or Red River backwater fuseplug levee will not be affected. To be consistent with other features of the MR&T project in the area, a freeboard of 4 feet above the project design flowline will be added for final levee grade. The recommended freeboard will minimize overtopping of the levee due to wave runup, inaccuracies in estimating the flowline, and temporary loss of channel cross section. Four feet of freeboard is required due to the complex floodflow diversions in the vicinity of the Old River and the Morganza control structures. This reach of the river is subject to short

contents, and roads and \$28,000 in damages to agriculture. Future evacuation of the prison compound during high-water periods without project would be prevented, thus saving an average annual cost of \$214,000 for the emergency evacuation and subsistence of inmates. In addition, an average annual savings of \$25,000 in emergency flood-fight costs and \$3,000 in levee repair costs would be realized with the project.

6.3.2 Plan A1. The implementation of this plan would provide the same protection, and therefore the same effects, as implementation of Plan A.

6.4 NATIONAL REGISTER OF HISTORIC PLACES

6.4.1 Plan A. This plan would not affect any cultural resources presently listed on the National Register of Historic Places.

6.4.2 Plan A1. Same as Plan A.

6.5 WATER BODIES AND ASSOCIATED WETLANDS

6.5.1 Plan A. The implementation of this plan would result in direct impacts to approximately 10 acres of these resources. These impacts would result from excavation of borrow material from open-water and wetland areas within the confines of the borrow area alignment as indicated on Plate 3 and the deposition of fill material for haul roads into the existing borrow pits. Benthic organisms would be destroyed at haul road sites following the introduction of fill material. The excavation of borrow material from open-water areas would result in temporary adverse impacts. This would involve the removal of organic matter which would reduce food sources and the diversity of substrates available to benthic organisms. Construction activities would also temporarily cause increases in turbidity and a resulting decrease in light penetration. The excavation action would result in the removal of the vegetative canopy which would eventually allow greater light intensity and, subsequently, higher water temperatures and greater photosynthetic activity. The

TABLE C-1--DESIGN FLOWLINE ELEVATIONS,¹ FOR DETAILED PLANS
(IN FEET NGVD)

<u>Levee Station</u>	<u>Existing Flowline</u>	<u>Plans A & A1</u>
640+00 mainline levee	62.0	62.0
557+50 mainline levee (Pumping station)	62.4	62.4
448+00 mainline levee 0+00 Charity Lake levee	63.6	63.7
125+00 Charity Lake levee (Angola Ferry Landing)	64.1	64.2
293+00 mainline levee 249+00 Charity Lake levee	64.7	64.9
290+00 mainline levee 153+00 Monkey Island levee	64.9	65.1
148+81 mainline levee 0+00 Monkey Island levee	66.9	67.0
0+00 mainline levee	67.4	67.5

¹Note, 1 foot added to the design flowline for loop effect

river-wave action to the levee and the soil-holding function provided by growing tree roots. The destruction of the above designated amount of these forests would result in the elimination of a corresponding amount of tree cavities, rotting tree materials and associated insects, assorted mast and browse materials and understory with ground cover providing wildlife escape cover. After construction natural forest succession

would use more shallow areas. The amount of use, however, would be dependent upon food-producing vegetation developing along shorelines. Water dependent furbearers would receive increased amounts of habitat due to creation of borrow pits. Habitat quality would initially be very poor, but would improve with the establishment of shoreline vegetation. The conversion of approximately 266 acres of open land to borrow area would result in the permanent removal of that amount of open-land habitat from the subject area and a corresponding loss to all species inhabiting that area.

6.7.2 Plan A1. The implementation of this plan would result in comparatively less severe impacts to terrestrial wildlife resources than would implementation of the previously described plan. Approximately 5 acres of woodlands would be destroyed with this plan. As mentioned previously, destruction or displacement of wildlife species occupying that habitat would occur. Also, destruction is most probable since carrying capacities of adjacent woodlands would, no doubt, remain the same. Borrow excavation would also result in the creation of 345 acres of aquatic habitat with this plan providing the same benefits to wildlife as described previously. However, the conversion of 345 acres of open land to aquatic habitat would result in a corresponding loss to wildlife occupying open-land habitat.

6.8 FISHERY RESOURCES

6.8.1 Plan A. Implementation of this plan entailing the excavation of approximately 345 acres for borrow material would result in the conversion of 335 of those acres to aquatic habitat available for fisheries utilization. Since 10 acres of the total requirements are in existing borrow pits this excavation would cause temporary adverse impacts to the fishery resource in these areas. Habitat quality would be very low in the borrow pits initially as diversity would be lacking completely until submergent, emergent, and shoreline vegetation becomes established. Benthic material would develop slowly, providing a limited contribution to the aquatic food chain during the first year. Phytoplankton production would be limited initially, but would increase rapidly. Fish populations would be established in most borrow pits by inundation from

high spring river flows, but population development would be dependent upon population development of lower members of the food chain. Fish population development in the Charity Lake borrow segment would not progress at the same rate as other areas because this area receives infrequent river flooding. Fish population establishment in this area

STABILITY ANALYSES

The Angola levee system would be rehabilitated by constructing a riverside or landside enlargement of the existing levee. The enlargement would result in a grade increase of 8.5 feet on the mainline levee, for the project design flood. Slope stability analyses were run on the most critical soil conditions for a riverside or landside enlargement of the existing levee to the maximum elevation and design section. The analyses indicate that the upgraded levee would meet the design factor of safety of 1.30; see plates C-3 and C-4.

UNDERSEEPAGE ANALYSES

During the 1973 flood, the performance of the existing Angola levee system was monitored by the Louisiana Department of Transportation and Development, Office of Public Works. In a memorandum summarizing their activities at the Angola levees between 24 January and 3 June 1973, the Department of Public Works reported serious seepage occurring throughout the levee system. Numerous sand boils developed and were sandbagged in the Camp F area (see plate C-1). Heavy seepage was reported in the mainline levee between station 0+00 and station 290+00. Within this area, the Monkey Island outer levee was overtopped on 30 March 1973. Little seepage was noted between stations 290+00 and 448+00. In this area, the Charity Lake outer levee withstood the 1973 floodwaters, thus preventing the floodwaters from affecting the mainline levee. The mainline levee lies on a point bar deposit and can be susceptible to seepage. Numerous sand boils and serious seepage were reported in the area between the Charity Lake levee and the mainline levee. Seepage from station 470+00 to station 540+00 that occurred during the 1973 flood was later reported to US Army Corps of Engineers personnel during a field trip to Angola in September 1976. Seepage problems that were observed during the 1973 flood are summarized in table C-3.

The two methods considered for controlling underseepage at the Angola levee system are relief wells and landside seepage berms (see

6.10 AUDUBON SOCIETY BLUE LIST

6.10.1 General. Implementation of either plan would not significantly affect any species of bird on the 1981 Blue List. However, the primary habitat for the majority of birds on the Blue List found in the study area is forests, and Plan A destroys more forest than Plan A1. Therefore, Plan A would impact more adversely a greater number of species than Plan A1. Species which may be found in the study area regarding severity of impacts for each plan are as follows:

6.10.2 Plan A - Species Impacts

Not Impacted

Black Vulture
Bachman's Sparrow
King Rail
Upland Sandpiper
Least Tern
Black Tern
Burrowing Owl
Short-eared Owl
Cliff Swallow
Purple Martin
Bewick's Wren

Beneficially Impacted

Common Loon
Double-crested Cormorant
Great Blue Heron
Black-crowned Night Heron
Least Bittern
American Bittern
Wood Stork
Black Duck
Canvasback
Osprey
Common Tern

Slightly Adversely Impacted

Marsh Hawk
Sharp-shinned Hawk
Cooper's Hawk
Red-shouldered Hawk
Hairy Woodpecker
Merlin
Yellow-billed Cuckoo
Barn Owl
Common Screech Owl
Whip-poor-will
Common Nighthawk
Ruby-throated Hummingbird
Golden-crowned Kinglet
Loggerhead Shrike
Red-headed Woodpecker
Henslow's Sparrow
Bobwhite
Eastern Meadowlark
Dickcissel
Grasshopper Sparrow
Willow Flycatcher
Carolina Wren
Eastern Bluebird

TABLE C-3--SEEPAGE OBSERVATIONS DURING THE 1973 FLOOD

<u>REACH</u>	<u>LEVEE</u>	<u>STATION TO STATION</u>	<u>BORING</u> ¹	<u>OBSERVATIONS DURING 1973 FLOOD</u>
1	Mainline	0+00 to 148+81	1-ANG	Heavy seepage, numerous sand boils developed in Camp P.
2	Mainline	148+81 to 290+00	3-ANG	Heavy seepage, outer levee (Monkey Island) overtopped.
3	Mainline	290+00 to 448+00	5-ANG	No seepage, outer levee (Charity Lake) withstood the 1973 flood. Sand boils reported in the area between the Charity Lake levee and the mainline levee.
4	Mainline	448+00 to 470+00		No seepage.
5	Mainline	470+00 to 540+00		Seepage and sand boils were reported.
6	Mainline	540+00 to 640+00	6-ANG	No seepage was reported.
7	Monkey Island	0+00 to 153+00	2-ANG	Levee overtopped.
8	Charity Lake	0+00 to 290+00	4-ANG	Levee withstood the 1973 flood. Sand boils developed in the area between the Charity Lake and the mainline levee.

^{1/} See plate C-1 for location of borings.

plate C-5). Seepage analyses based on the general type borings and DIVR 1110-1-400, dated 30 November 1976, indicate that a seepage berm is not required (see DIVR 1110-1-400, appendix A). However, as stated in DIVR 1110-1-400, a standard seepage berm should be constructed in areas where seepage was observed. Relief well calculations are based on

7. LIST OF PREPARERS

The following persons were primarily responsible for preparing this Environmental Impact Statement:

NAME	EXPERTISE	DISCIPLINE/ EXPERIENCE	ROLE IN PREPARING EIS
Mr. William C. Wilson	Biology/Wildlife, Game Management	6 years, Wildlife Biologist, Georgia Dept. of Natural Resources; 2 years EIS studies, Corps of Engineers New Orleans District	Effects on Wildlife and Fishery Resources, EIS Coordinator
Ms. Carroll H. Kleinbans	Archeology	4 years, Field and Analysis; 2 years, HCRS, Dept. of Interior; 1 year, Corps of Engineers, Memphis and New Orleans Districts	Effects on Cultural Resources
Mr. Carl E. Anderson	Engineering/Civil, Water Resources	2 years, Civil Engineer, Corps of Engineers, New Orleans District	Study Manager, Survey Report Coordinator
Mr. Peter C. Womack	Economics	3 years, Economist, Corps of Engineers, New Orleans District	Plan Economics, Effects on Prison Facilities and Agricultural Lands
Mr. Daniel Smith	Engineer/Environ- mental Engineer	2 1/2 years, Environmental Engineer Corps of Engineers, New Orleans	Effects on Water Quality
Ms. Lynn Devaul	Engineering/Civil Water Resources	2 years, Civil Engineer, Metcalf & Eddy, Inc.; 2 years, Civil Engineer, Corps of Engineers, New Orleans District	Study Manager

DETAILED COST ESTIMATES

Detailed cost estimates for each of the preliminary plans are shown in table C-4. The first cost estimates for the two detailed plans are shown in table C-5. Table C-6 is an updated cost estimate (1981 price levels) for the recommended plan, plan A1.

LIST OF PREPARERS (Cont.)

NAME	EXPERTISE	DISCIPLINE/ EXPERIENCE	ROLE IN PREPARING EIS
Mrs. Suzanne R. Hawes	Botanist, Fisheries Biologist/Marsh Ecology	1 year Lab Associate, LSU Medical School; 8 years EIS studies, Corps of Engineers, New Orleans District	Review
Mr. Henry P. Glaviano	English/Technical Writing and Editing	4 years, Technical Writer/Editor, The Boeing Company; 10 years Technical Writer/Editor, Corps of Engineers, New Orleans District	Review and Editorial Assistance

8. PUBLIC INVOLVEMENT

8.1 PUBLIC INVOLVEMENT PROGRAM

The study was initiated with a public meeting held in Baton Rouge, Louisiana, on 22 April 1976, to obtain the views of local interests concerning their problems and needs and to allow governmental agencies an opportunity to indicate their interest in the study. At this meeting, participants requested Federal participation in the construction of an improved levee system to protect the penitentiary. A detailed plan of study was prepared in May 1977 and coordinated with interested Federal and state agencies. An information brochure was distributed in July 1980 to inform the public of the results of Stage II studies and to request comments concerning any aspect of the proposed alternatives or their potential environmental impacts. The final public meeting was held on 25 September 1981 in Baton Rouge, Louisiana, to obtain comments from the public on the tentatively selected plan. Coordination has been maintained with the US Fish and Wildlife Service and Louisiana Department of Wildlife and Fisheries.

8.2 REQUIRED COORDINATION

The draft report with the environmental impact statement (EIS) was furnished to Federal and state agencies and to other interested entities for review. Approximately 30 days following the promulgation of these documents, a final public meeting was held to discuss the tentatively recommended plan. Following the public meeting and receipt of comments on the draft report and EIS, the tentative plan was adopted as the recommended plan. The New Orleans District Engineer is issuing this final report presenting the recommended plan and submitting it with the final EIS to the President of the Mississippi River Commission, US Army Corps of Engineers, Vicksburg, Mississippi.

8.3 STATEMENT RECIPIENTS

8.3.1. FEDERAL

J. Bennett Johnston, US Senator

Russell B. Long, US Senator

W. Henson Moore, US Congressman

Gillis W. Long, US Congressman

US Department of the Interior, Assistant Secretary for Program Development and Budget, Office of Environmental Project Review

US Fish and Wildlife Service, Regional Director, Atlanta, Georgia

US Fish and Wildlife Service, Area Manager, Jackson, Mississippi

US Fish and Wildlife Service, Field Supervisor, Lafayette, Louisiana

Environmental Protection Agency, Regional Administrator, Region VI

Environmental Protection Agency, Administrator, Washington, DC

US Department of Commerce, Deputy Assistant Secretary for Environmental Affairs

US Department of Commerce, National Oceanic and Atmospheric Administration, Office of Ecology and Conservation

US Department of Commerce, Director, National Oceanic and Atmospheric Administration, National Ocean Survey

US Department of Commerce, Meteorologist in Charge, National Weather Service, New Orleans Area

US Department of Commerce, Regional Director, National Marine Fisheries Service

US Department of Commerce, Area Supervisor, National Marine Fisheries Service, Water Resources Division

US Department of Agriculture, Regional Forester, Forest Service

US Department of Agriculture, State Conservationist, Soil Conservation Service

TABLE C-5--DETAILED LEVEE PLANS FIRST COST
(October 1980 price levels)

Item	Unit	Unit Price (\$)	Plan A		Plan A1	
			Quantity	Amount (\$)	Quantity	Amount (\$)
Clearing and Grubbing	Acre	1,000	835	835,000	835	835,000
Embankment (Semi Comp)						
Normal Hauling Distances	C.Y.	2.25	3,271,500	7,361,000	2,313,400	5,205,000
Longer Hauling Distances	C.Y.	2.50	-	-	958,000	2,395,000
Bermes (Uncomp)	C.Y.	1.25	780,000	975,000	780,000	975,000
Surfacing (sand, clay, and gravel)	C.Y.	15.00	18,000	270,000	18,000	270,000
Fertilizing and Seeding	Acre	400	433	173,000	433	173,000
Drainage Structures				2,311,000		2,311,000
Environmental Protection (0.5 percent)	L.S.			60,000		61,000
Subtotal				11,985,000		12,225,000
Contingencies (25%±)				2,996,000		3,056,000
Subtotal				14,981,000		15,281,000
E&D (6%±)				899,000		917,000
S&A (6%±)				899,000		917,000
Rights-of-way				1,159,000		1,159,000
TOTAL				17,938,000		18,274,000

TABLE C-6--RECOMMENDED PLAN FIRST COST
(October 1981 price levels)

Item	Unit	Unit Price (\$)	Plan A1	
			Quantity	Amount (\$)
Clearing and Grubbing	Acre	1,200	835	1,002,000
Embankment (Semi Comp)				
Normal Hauling Distances	C.Y.	2.60	2,313,400	6,015,000
Longer Hauling Distances	C.Y.	2.80	958,000	2,778,000
Berms (Uncomp)	C.Y.	1.50	780,000	1,170,000
Surfacing (sand, clay, and gravel)	C.Y.	17.50	18,000	315,000
Fertilizing and Seeding	Acre	500	433	217,000
Drainage Structures				2,660,000
Environmental Protection (0.5 percent)	L.S.	70,000		<u>70,000</u>
Subtotal				14,227,000
Contingencies (25%±)				<u>3,574,000</u>
Subtotal				17,801,000
E&D (6%±)				1,070,000
S&A (6%±)				1,070,000
Rights-of-way				<u>1,159,000</u>
TOTAL				21,100,000

STATE (Continued)

Louisiana Department of Wildlife and Fisheries Game Division, Chief

Louisiana Department of Wildlife and Fisheries Fish Division, Chief

Louisiana Department of Wildlife and Fisheries Coordinator,
Environmental Section

Louisiana Department of Wildlife and Fisheries, Baton Rouge District
Office No. 7

Louisiana State Parks and Recreation Commission

Louisiana Archaeological Survey and Antiquities Commission, State
Archaeologist

Louisiana Office of Environmental Affairs

Louisiana Coastal Commission

Louisiana Public Service Commission

Louisiana Department of Natural Resources, Office of Forestry

Louisiana Department of Natural Resources, Office of Conservation

Louisiana Department of Natural Resources, Office of Environmental
Affairs, Water Pollution Control Division

Louisiana Department of Commerce and Industry

Louisiana Department of Culture, Recreation, and Tourism, State
Historic Preservation Officer

Louisiana Assistant Attorney General

Louisiana Department of Justice, Environmental Section

Louisiana Joint Legislative Committee on Environmental Quality,
Louisiana Legislature

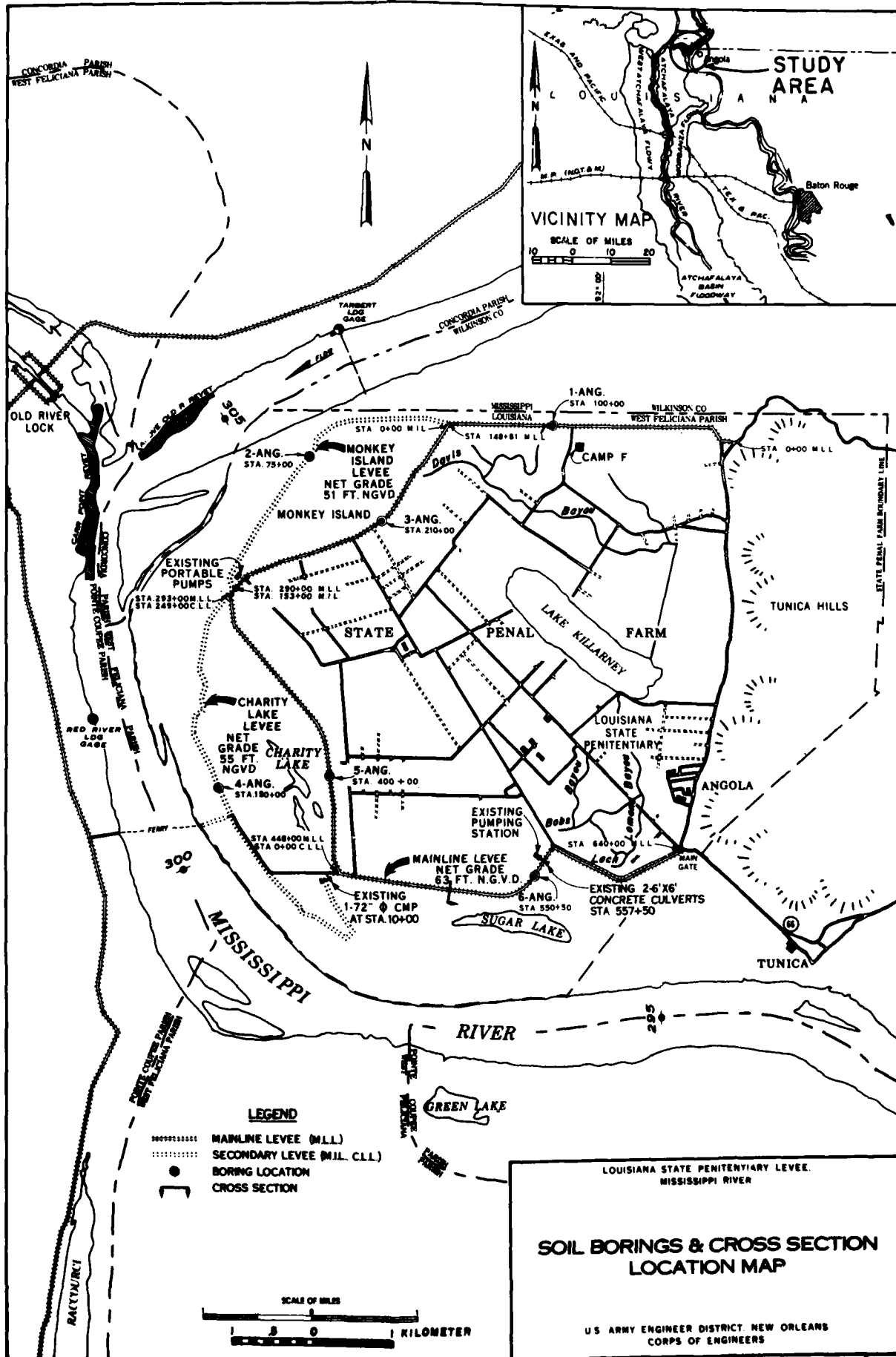
Louisiana State Land Office Register

Louisiana State Planning Office

Louisiana State Soil and Water Conservation Committee

Louisiana State University, Associate Director, Sea Grant Program,
Center for Wetland Resources

Louisiana State University, Coastal Studies Institute



STATE (Continued)

Louisiana Department of Culture, Recreation, and Tourism, State
Historic Preservation Officer

Louisiana Assistant Attorney General

Louisiana Department of Justice, Environmental Section

Louisiana Joint Legislative Committee on Environmental Quality,
Louisiana Legislature

Louisiana State Land Office Register

Louisiana State Planning Office

Louisiana State Soil and Water Conservation Committee

Louisiana State University, Associate Director, Sea Grant Program,
Center for Wetland Resources

Louisiana State University, Coastal Studies Institute

Louisiana State University, Cooperative Wildlife Research Unit

Louisiana State University, Curator of Anthropology, Department of
Geography and Anthropology

University of New Orleans, Coordinator, Environmental Impact
Section, Department of Environmental Affairs

University of New Orleans, Department of Anthropology and Geography

Office of Emergency Preparedness

8.3.3. CITIZENS GROUPS (National and Local)

Ecology Center of Louisiana, Inc.

Orleans Audubon Society, c/o Mr. Barry Kohl

National Audubon Society, Library

National Audubon Society, Southwestern Regional Office, Regional
Representative

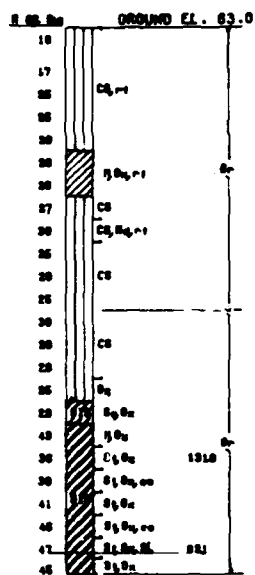
National Audubon Society, Field Research Director

National Audubon Society, Director of Audubon Sanctuaries

BOR. 3-ANG

STA. 210+00
MAIN LINE CEVEE ON C/L

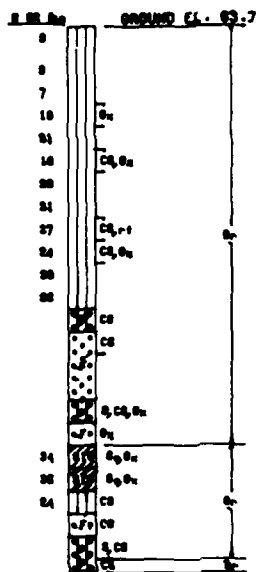
25 MAR. 78



BOR. 4-ANG

STA. 150+00
CHANNEL LAKE CEV. ON C/L

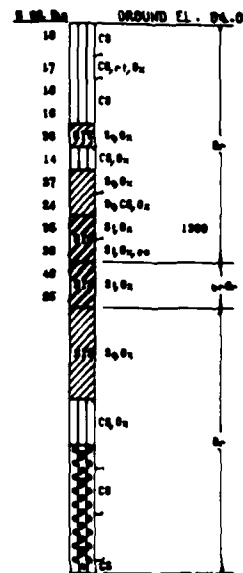
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BOR. 5-ANG

STA. 400+00
MAIN LINE CEVEE ON C/L

31 MAR. 1978



BOR. 6-ANG

STA. 500+00
MAIN LINE CEVEE ON C/L

30 MAR. 1978



8.4 STATEMENT COMMENTATORS

FEDERAL

Department of Agriculture
Soil Conservation Service
Alexandria, LA

Department of Commerce
Director of Regulatory Policy
Washington, DC

Department of Commerce
National Oceanic and Atmospheric
Administration
National Ocean Survey
Rockville, MD

Department of Health and Human
Services
Public Health Service
Centers for Disease Control
Atlanta, GA

Department of Housing and Urban
Development
Fort Worth Regional Office

Department of the Interior
Office of the Secretary
Southwest Region

Department of Transportation
Federal Highway Administration
Baton Rouge, LA

Environmental Protection Agency
Region VI

STATE

Department of Culture, Recreation
and Tourism
Office of Program Development
State Historic Preservation Officer

Department of Transportation and
Development
Office of Public Works

Department of Wildlife and Fisheries
New Orleans, LA

ORGANIZATIONS

Capital-Area Groundwater Conservation
Commission

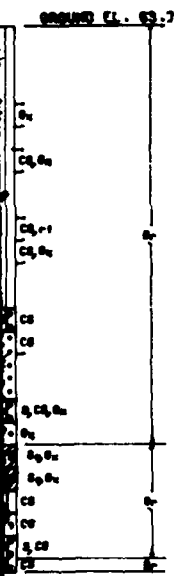
Wildlife Management Institute

R. 4-ANG

STA. 150+00

TY LAKE LEV. ON C/L

MAR. 1978

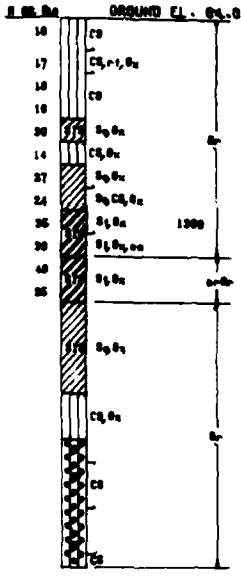


BOR. 5-ANG

STA. 400+00

MAINLINE LEVEE ON C/L

31 MAR. 1978

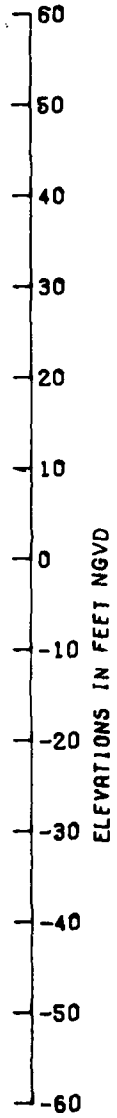
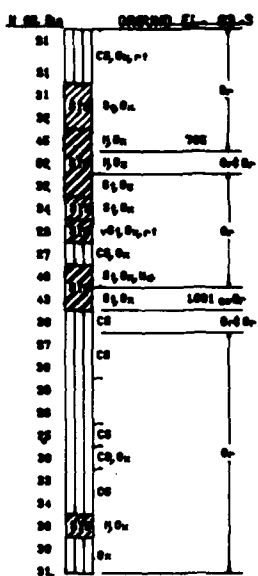


BOR. 6-ANG

STA. 550+00

MAINLINE LEVEE ON C/L

30 MAR. 1978



LOUISIANA STATE PENITENTIARY LEVEE, MISSISSIPPI RIVER

SOIL BORING LOGS

MILE 297 TO 306

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS

NEW ORLEANS

8.5 PUBLIC VIEWS AND RESPONSES

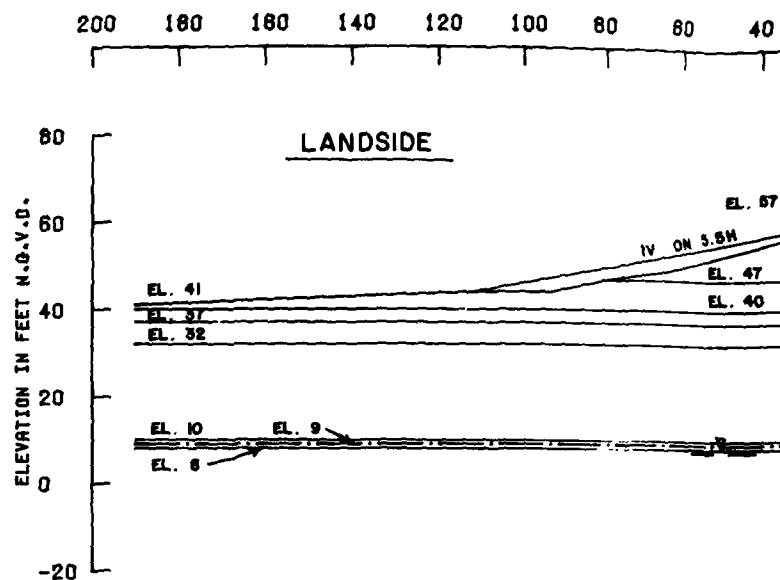
8.5.1. The views expressed to this agency which had a major influence on the decision-making process were the need for flood protection for the penitentiary and the concern for avoiding environmental degradation. These views resulted in the elimination of preliminary plans and the eventual development of the detailed plans described in this report.

8.5.2. The comments received from all agencies and organizations to the draft report and EIS and the respective responses are displayed in Appendix G.

8.5.3. The US Department of Health and Human Services, Center for Disease Control expressed concern, primarily, that existing or potential mosquito or other vector populations and associated needs were not addressed. A listing of the most common mosquito vectors inhibiting the study area and impacts are provided within the sections on Water Bodies and Associated Wetlands in the EIS. Vector control will be emphasized in the advanced engineering and design report indicating the responsibility and methods by which vector problems would be minimized.

8.5.4. The US Department of the Interior commented that the Corps of Engineers should utilize professionals in archeology, architecture, and history when conducting the proposed cultural resources survey and also must request determinations of eligibility for the National Register on each site and structure identified in that survey. The proposed survey will be conducted utilizing professionals of all appropriate disciplines. The survey results will be coordinated with the Louisiana State Historic Preservation Officer, whose opinion regarding significance will be requested. Formal requests for determinations of eligibility will be made for those sites which meet National Register criteria (36 CFR 60.4) of significance.

8.5.5 The Wildlife Management Institute comments addressed, primarily, the increased costs of Plan A1 over Plan A. They recommended that these



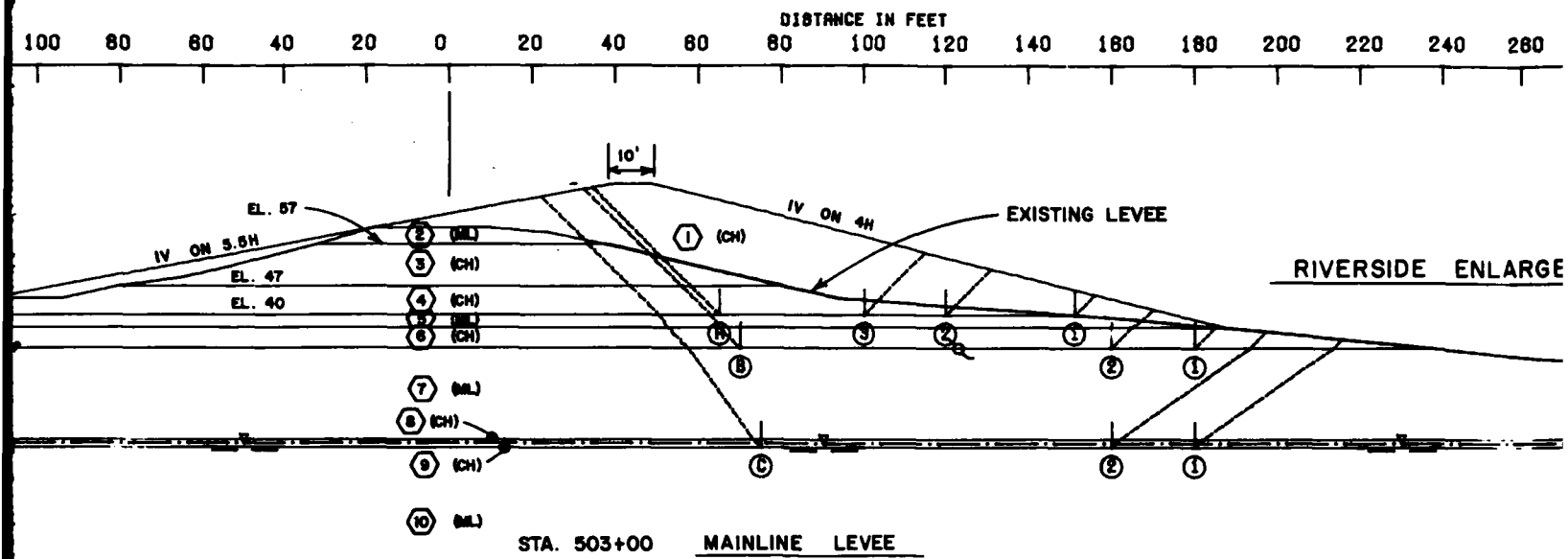
GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
BORING 6-ANG.

STRATUM NO.	SOIL TYPE	EFFECTIVE UNIT WT. P.C.F.		C - UNIT COHESION - P.S.F.			
				CENTER OF STRATUM		BOTTOM OF B	
		VERT. 1	VERT. 2	VERT. 1	VERT. 2	VERT. 1	VERT. 2
①	CH	110.0	110.0	400.0	400.0	400.0	4
②	ML	117.0	117.0	200.0	200.0	200.0	2
③	CH	112.0	112.0	700.0	700.0	700.0	7
④	CH	112.0	112.0	1050.0	1050.0	1050.0	1
⑤	ML	117.0	117.0	200.0	200.0	200.0	2
⑥	CH	112.0	112.0	1050.0	1050.0	1050.0	1
⑦	ML	117.0	117.0	200.0	200.0	200.0	2
⑧	CH	112.0	112.0	1050.0	1050.0	1050.0	1
⑨	CH	50.0	50.0	1050.0	1050.0	1050.0	1
⑩	ML	55.0	55.0	200.0	200.0	200.0	2

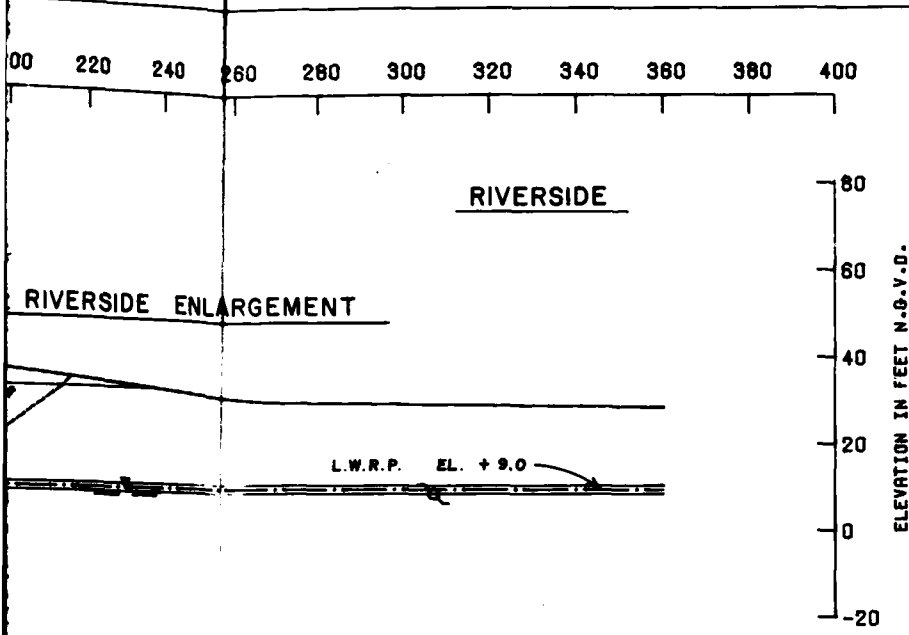
1 funds be utilized to purchase a larger acreage of bottomland hardwoods adjacent to one of the existing Louisiana Department of Wildlife and Fisheries wildlife management areas, with these lands being turned over to that agency for management. The increased costs of Plan A1 over Plan A result from the expense of minimizing environmental damage within the study area. The loss of 74 acres of bottomland hardwoods which would occur with Plan A can be avoided. Plan A would result in the certain destruction of these resources and would constitute a net loss of this habitat. The term net loss is used because only creation of an additional 74 acres of bottomland hardwoods would replace the acres lost, in the strictest sense. Although we appreciate the position of the Wildlife Management Institute concerning public use, it is the opinion of this agency that the bottomland hardwoods that would be destroyed with Plan A have an inherent ecological value to the specific study area which could not be compensated for by land acquisition elsewhere.

2



C - UNIT COHESION - P.S.F.				FRICTION ANGLE DEGREES
CENTER OF STRATUM		BOTTOM OF STRATUM		
VERT. 1	VERT. 2	VERT. 1	VERT. 2	
400.0	400.0	400.0	400.0	0.0
200.0	200.0	200.0	200.0	20.0
700.0	700.0	700.0	700.0	0.0
1050.0	1050.0	1050.0	1050.0	0.0
200.0	200.0	200.0	200.0	20.0
1050.0	1050.0	1050.0	1050.0	0.0
200.0	200.0	200.0	200.0	20.0
1050.0	1050.0	1050.0	1050.0	0.0
1050.0	1050.0	1050.0	1050.0	0.0
200.0	200.0	200.0	200.0	20.0

ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.	ELEV.	R _A	R _B	R _P	D _A	-D _P	RESISTING	DRIVING	
(A) ①	40.00	37741	90300	3924	50958	1581	131984	49375	2.673
(A) ②	40.00	37741	57750	11484	50958	8316	108975	42840	2.508
(A) ③	40.00	37741	38750	18381	50958	15471	90852	35485	2.580
(B) ①	32.00	54185	98187	10820	79382	2032	184182	77380	2.122
(B) ②	32.00	54185	87882	14382	79382	8108	158210	73288	2.132
(C) ①	8.00	124008	110250	81072	210007	45272	285330	184735	1.793
(C) ②	8.00	124008	89250	73589	210007	55491	288828	154518	1.858



SUMMATION OF FORCES		FACTOR OF SAFETY
RESISTING	DRIVING	
91984	49375	2.878
88975	42840	2.500
8852	35486	2.580
84192	77380	2.122
88210	73289	2.132
85330	184735	1.798
88828	184518	1.958

NOTES

- -- STRUTUM NUMBER
- -- WEDGE NUMBER
- -- CROSSOVER POINT
- Φ -- ANGLE OF INTERNAL FRICTION, DEGREES
- C -- UNIT COHESION, P.S.F.
- ∇ -- STATIC WATER SURFACE
- D -- HORIZONTAL DRIVING FORCE IN POUNDS
- R -- HORIZONTAL RESISTING FORCE IN POUNDS
- A -- AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE
- B -- AS A SUBSCRIPT REFERS TO CENTRAL BLOCK
- P -- AS A SUBSCRIPT REFERS TO PASSIVE WEDGE

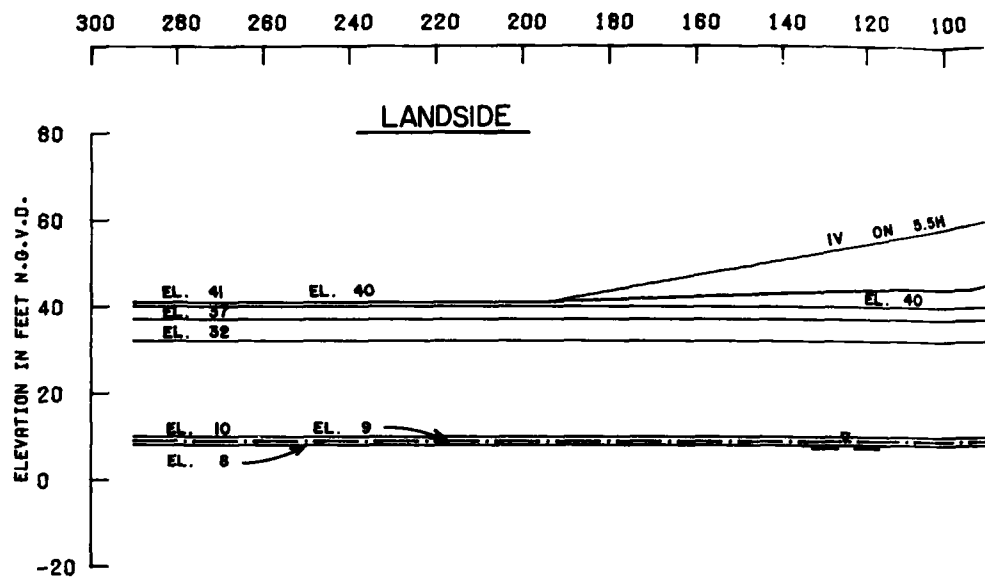
$$\text{FACTOR OF SAFETY} = \frac{R_a + R_b + R_p}{D_a - D_p}$$

LOUISIANA STATE PENITENTIARY
MISSISSIPPI RIVER
MAINLINE LEVEE, RS
LEVEE STABILITY ANALYSIS
U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS

TABLE 9 - INDEX, REFERENCES, AND APPENDICES

STUDY DOCUMENTATION

Subject	Environmental Impact Statement	Main Report (References Incorporated)	Report Appendixes (References Incorporated)
Affected environment	pp. EIS-17-24, para 5	pp. 6-10	App. A, pp. A-2-7; App. D, Sec. I, II, & III;
Alternatives	pp. EIS-11-16, para 4	pp. 15-43	App. B
Areas of controversy	p. EIS-4, para 1.2	--	--
Comparative impacts of alternatives	pp. EIS-16, para 4.4	pp. 37-42	App. B, pp. B-26-28
Cover sheet	p. EIS-1	--	--
Environmental conditions	pp. EIS-17-18, para 5.1	pp. 6-10	App. A, pp. A-2-7 App. D, Sec. I, II, & III
Environmental effects	pp. EIS-25-32, para 6	pp. 31-33	App. B, pp. B-20-22; App. D, Sec. I & II
Index, references, and appendixes	pp. EIS-44-46, para 9	--	--
List of Preparers	pp. EIS-33-34, para 7	--	--
Major conclusions and findings	pp. EIS-3-4, para 1.1	pp. 35	App. B, pp. B-24-25
Need for and objectives of study	pp. EIS-9-10, para 3	pp. 5-6	App. A, pp. A-10-11
Nonstructural alternative	pp. EIS-13, para 4.2.2	pp. 16-17	App. B, pp. B-3-4
Planning objectives	p. EIS-10, para 3.3	p. 14	App. A, p. A-13
Plans considered in detail	pp. EIS-13-15, para 4.3	pp. 24-43	App. B, pp. B-11-29
Plans eliminated from further study	pp. EIS-11-12, para 4.1	pp. 17-24	App. B, pp. B-4-11



GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
BORING 6-ANG.

STRATUM NO.	SOIL TYPE	EFFECTIVE UNIT WT. P.C.F.		C - UNIT COHESION - P.S.		
				CENTER OF STRATUM		BOTTOM OF
		VERT. 1	VERT. 2	VERT. 1	VERT. 2	VERT. 1
①	CH	110.0	110.0	400.0	400.0	400.0
②	ML	117.0	117.0	200.0	200.0	200.0
③	CH	112.0	112.0	700.0	700.0	700.0
④	CH	112.0	112.0	1050.0	1050.0	1050.0
⑤	ML	117.0	117.0	200.0	200.0	200.0
⑥	CH	112.0	112.0	1050.0	1050.0	1050.0
⑦	ML	117.0	117.0	200.0	200.0	200.0
⑧	CH	112.0	112.0	1050.0	1050.0	1050.0
⑨	CH	50.0	50.0	1050.0	1050.0	1050.0
⑩	ML	55.0	55.0	200.0	200.0	200.0

Subject	Environmental Impact Statement	Main Report (References Incorporated)	Report Appendices (References Incorporated)
Plan implementation and responsibility	pp. EIS-15, para 4.3.3	pp. 34, 41-42	App. B, pp. B-18, 23
Public concerns	pp. EIS-9-10, para 3.2	pp. 13	App. A, pp. A-10-11
Public involvement	pp. EIS-35-43, para 8	pp. 3	--
Public involvement program	p. EIS-35, para 8.1	pp. 3	--
Public views and responses	p. EIS-42-43, para 8.5	--	--
Relationship of plans to environmental protection statutes and other environ- mental requirements	pp. EIS-5-7, para 1.4	--	--
Required coordination	pp. EIS-35, para 8.2	--	--
Significant resources	pp. EIS-18-24, para 5.2	pp. 6-10, 25-29, 31-33	App. A, pp. A-2-7; App. B, pp. B-13-17; 20-22 App. D, Sec I, II, & III
Agricultural lands	pp. EIS-16, 21, 25, para 4.4, 5.2.1, 6.2	pp. 9-10	App. A, pp. A-6-7
Audubon Society Blue List	pp. EIS-16, 23-24, 31-32, para 4.4, 5.2.9, 6.10	p. 32	App. B, p. B-21
Bottomland hardwoods and associated forests	pp. EIS-16, 20-21, 27-28 para 4.4, 5.2.5, 6.6	pp. 31-32	App. B, pp. B-14, 20 App. D, Sec II
Fishery resources	pp. EIS-16, 22, 29-30, para 4.4, 5.2.7, 6.8	p. 32	App. B, pp. B-20-21; App. D, Sec II
National Register of Historic Places	pp. EIS-16, 19, 26, para 4.4, 5.2.3, 6.4	pp. 28,	App. B, p. B-16; App. D, Sec III
Prison facilities	pp. EIS-16, 18-19, 25-26, para 4.4, 5.2.2, 6.3	pp. 9-10	App. E, pp. E-3-5

9 (CH) 10 (ML)

2 1

STA. 503 + 00 MAINLINE LEVEE

SECTION - P.S.F.		FRICTION ANGLE DEGREES
BOTTOM OF STRUTUM		
VERT. 1	VERT. 2	
400.0	400.0	0.0
200.0	200.0	20.0
700.0	700.0	0.0
1050.0	1050.0	0.0
200.0	200.0	20.0
1050.0	1050.0	0.0
200.0	200.0	20.0
1050.0	1050.0	0.0
1050.0	1050.0	0.0
200.0	200.0	20.0

ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.	ELEV.	R _A	R _B	R _P	D _A	- D _P	RESISTING	DRIVING	
(A) ①	40.00	40473	91789	88	51721	0	132310	51721	2.558
(A) ②	40.00	40473	74007	8400	51721	1117	122880	50604	2.428
(A) ③	40.00	40473	63893	15846	51721	4468	120212	47255	2.544
(B) ①	32.00	58510	154024	89	80484	0	210823	80484	2.617
(B) ②	32.00	58510	78529	23433	80484	10839	158472	89845	2.240
(B) ③	32.00	58510	57748	32541	80484	18543	148797	81941	2.370
(C) ①	8.00	124311	94500	87383	211571	88710	308193	144881	2.114
(C) ②	8.00	124311	73500	95185	211571	73387	292978	138183	2.120

○ -- STRUT
 ○ -- WEDGE
 ⌘ -- CIRC
 ⌘ -- ANGLE
 C -- UNIT
 V -- STRUT
 D -- HORI
 R -- HORI
 A -- AB F
 B -- AB F
 P -- AB F
 FACTOR OF

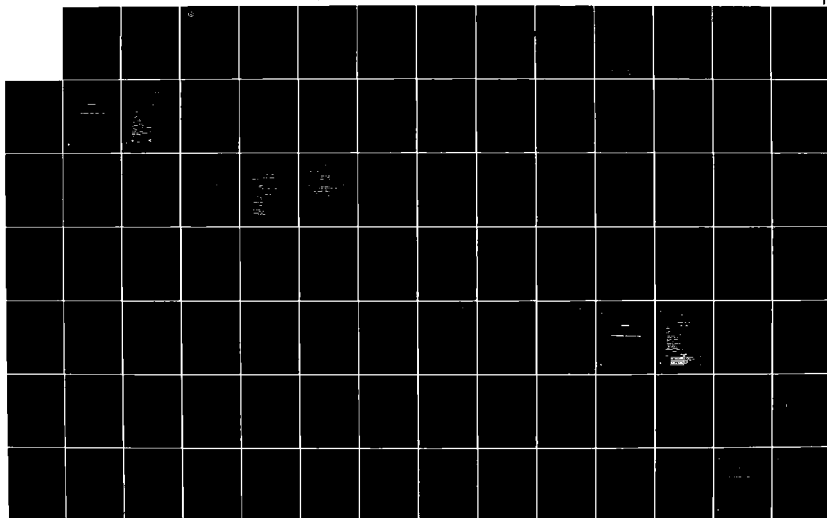
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LOUISIANA STATE PENITENTIARY LEVEE MISSISSIPPI RIVER
MAIN REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT
AND APPENDIXES(I) ARMY ENGINEER DISTRICT NEW ORLEANS LA
JAN 82 F/G 13/2

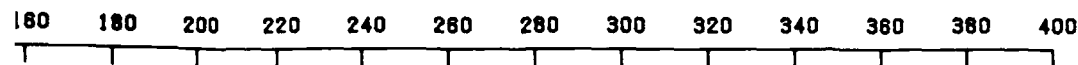
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NL

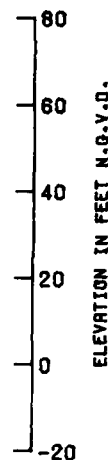
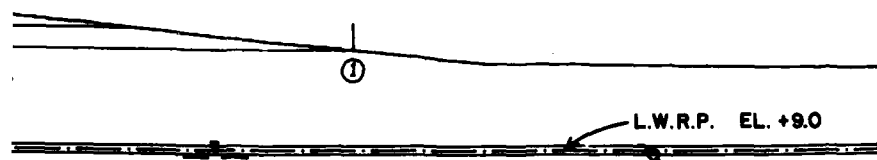


3



RIVERSIDE

LANDSIDE ENLARGEMENT



SUMMATION OF FORCES		FACTOR OF SAFETY
DRIVING	RESISTING	
110	51721	2.558
180	50804	2.428
212	47255	2.544
323	80484	2.817
472	89845	2.240
797	81941	2.370
103	144881	2.114
976	136183	2.120

NOTES

- -- STRUTUM NUMBER
- -- WEDGE NUMBER
- ⋈ -- CROSSOVER POINT
- φ -- ANGLE OF INTERNAL FRICTION, DEGREES
- C -- UNIT COHESION, P.S.F.
- ∇ -- STATIC WATER SURFACE
- D -- HORIZONTAL DRIVING FORCE IN POUNDS
- R -- HORIZONTAL RESISTING FORCE IN POUNDS
- A -- AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE
- B -- AS A SUBSCRIPT REFERS TO CENTRAL BLOCK
- P -- AS A SUBSCRIPT REFERS TO PASSIVE WEDGE

$$\text{FACTOR OF SAFETY} = \frac{R_A + R_B + R_P}{D_A - D_P}$$

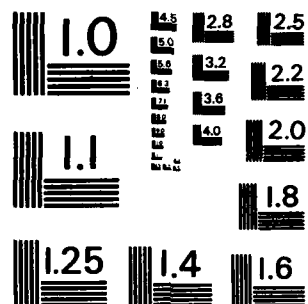
LOUISIANA STATE PENITENTIARY
MISSISSIPPI RIVER

MAINLINE LEVEE, LS
LEVEE STABILITY ANALYSIS

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS

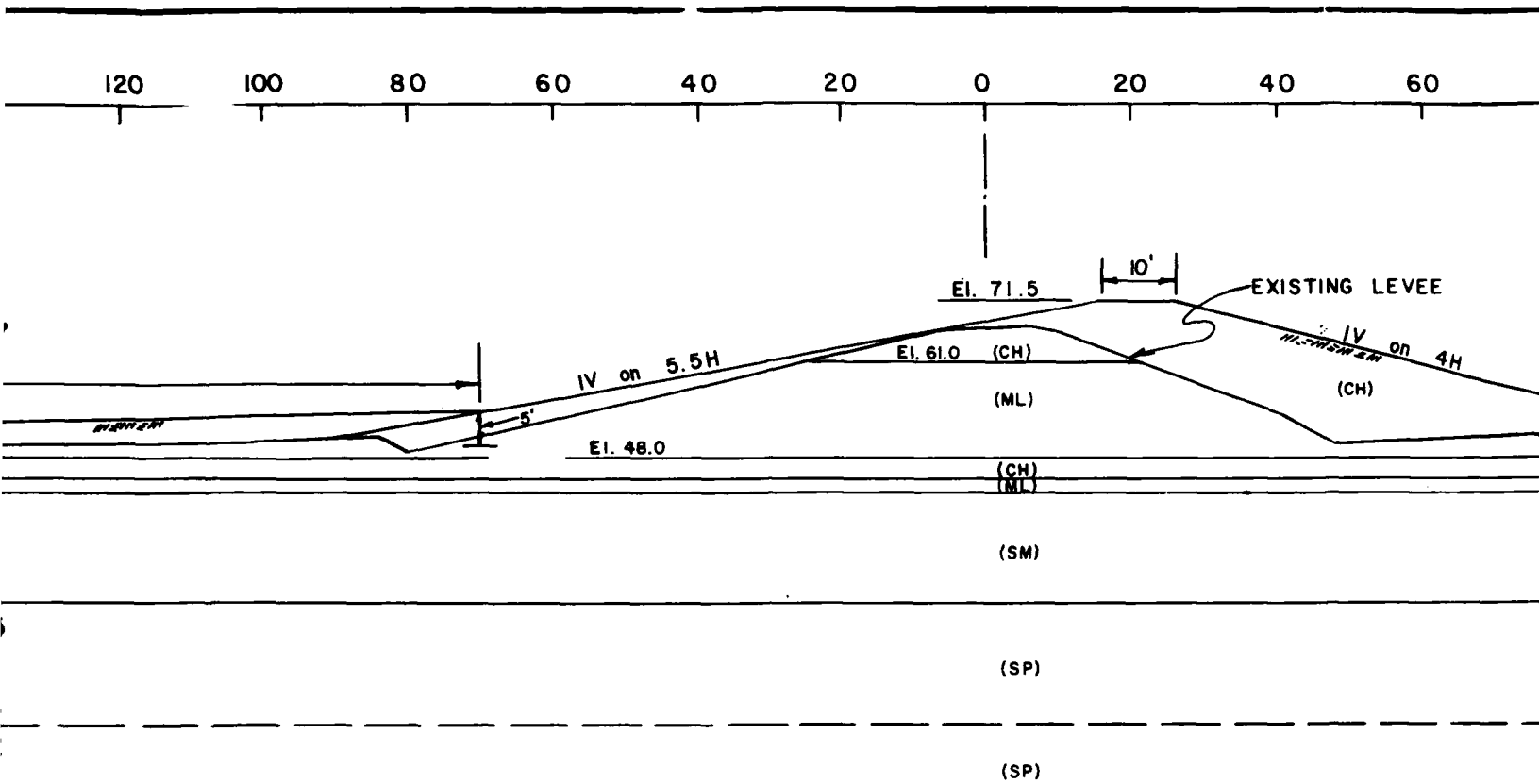
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PLATE C-4

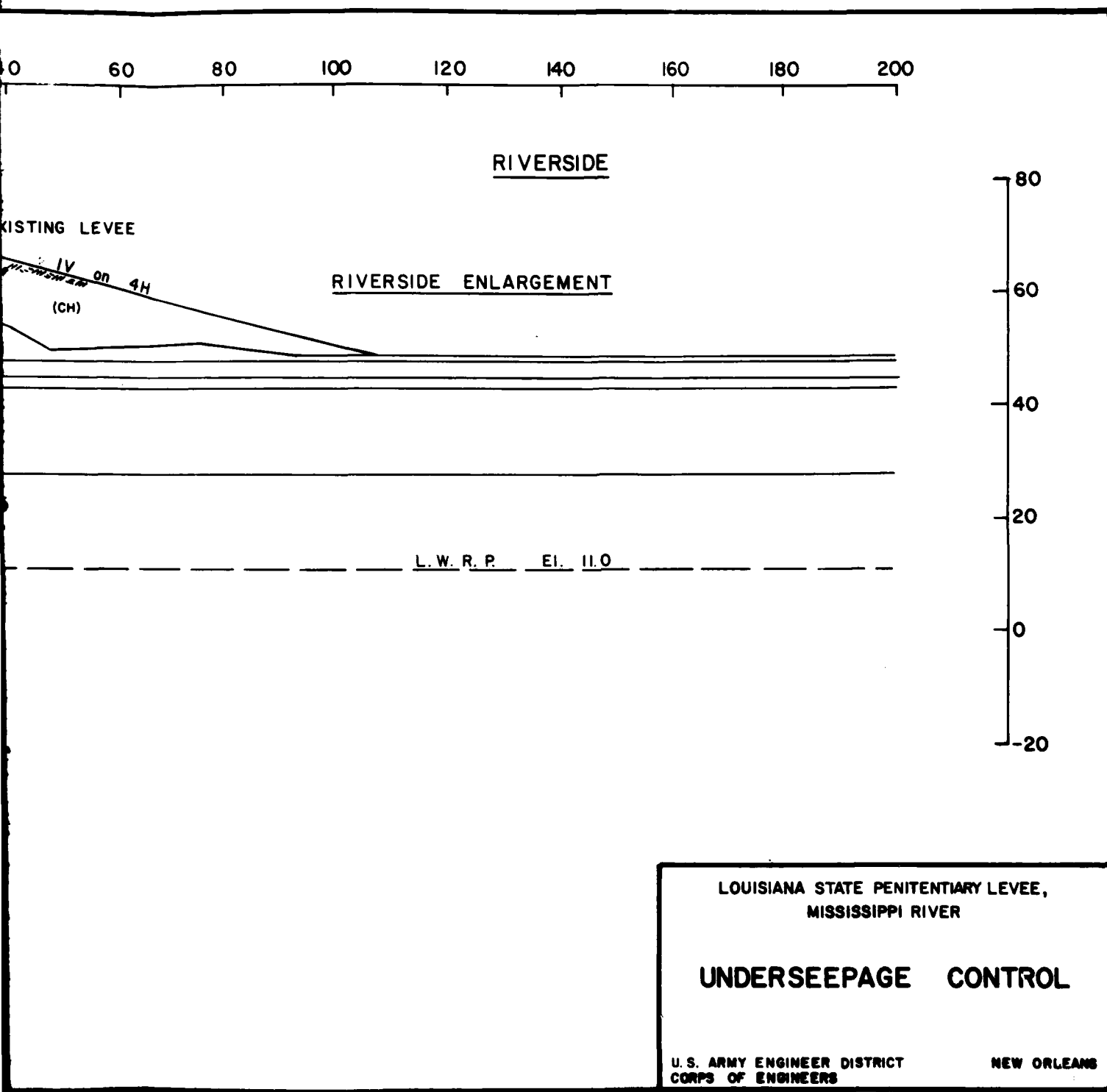


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

2



Subject	Environmental Impact Statement	Main Report (References Incorporated)	Report Appendices (References Incorporated)
Threatened and endangered species	pp. EIS-16, 22-23, 30, para 4.4, 5.2.8, 6.9	pp. 32	App. B, pp. B-15, 21; App. D, Sec I & II
Waters bodies and associated wetlands	pp. EIS-16, 19-20, 26-27, para 4.4, 5.2.4, 6.5	pp. 26, 31	App. B, pp. B-13-14, 20
Wildlife resources	pp. EIS-16, 21-22, 28-29, para 4.4, 5.2.6, 6.7	pp. 27, 32	App. B, pp. B-15, 21; App. D, Sec I & II
Statement commentators	p. EIS-41, para 8.4	--	--
Statement recipients	pp. EIS-36-40, para 8.3	--	--
Study authority	p. EIS-9, para 3.1	p. 2	App. A, p. A-1
Summary	pp. EIS-3-4, para 1	pp. 34-35	--
Table of contents	p. EIS-8, para 2	--	--
Unresolved issues	p. EIS-4, para 1.3	--	--
Without conditions	p. EIS-13, para 4.2	p. 14-15	App. A, p. A-10





DEPARTMENT OF THE ARMY
MISSISSIPPI RIVER COMMISSION, CORPS OF ENGINEERS
VICKSBURG, MISSISSIPPI 39180

ADDRESS REPLY TO:

PRESIDENT, MISSISSIPPI RIVER COMMISSION
CORPS OF ENGINEERS
P. O. BOX 60
VICKSBURG, MISSISSIPPI 39180

MRCPD-F

SUBJECT: Louisiana State Penitentiary Levee, Mississippi River (12087)

Commander
US Army Corps of Engineers
Washington, D. C. 20314

Summary of Commission Action

The Commission finds that improvements for flood protection at the Louisiana State Penitentiary at Angola are needed, economically justified and socially and environmentally acceptable. The Commission concurs in District Commander's plan for raising and strengthening about 12.1 miles of existing locally built mainline levee and incorporating it into the Federal levee system, replacing two existing 6- by 6-foot concrete culverts with two new 6- by 6-foot concrete culverts with sliding vertical sluice gates, and modifying discharge pipes for existing 120,000 gpm pumps to pass over the new levee. Total construction cost is estimated at \$21,100,000 (October 1981 price level). The benefit-cost ratio is 1.3.

Summary of Report Under Review

1. Authority. The Louisiana State Penitentiary Levee, Mississippi River study was authorized by a resolution adopted by the Committee on Public Works of the United States Senate on 5 September 1973. The resolution, requested by Senator Russell B. Long of Louisiana, is quoted as follows:

"RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Chief of Engineers, Department of the Army, is hereby requested to review the report on the Mississippi River and Tributaries Project, published as House Document 308 of the Eighty-eighth Congress, and other pertinent reports, with a view to determining whether incorporating the local levee at the Louisiana State Penitentiary into the Federal levee system is advisable."

2. District Commander's Report. The final Feasibility Report of the District Commander, U. S. Army Engineer District, New Orleans, which presents the

MRCPD-F

SUBJECT: Louisiana State Penitentiary Levee, Mississippi River (12087)

results of studies of flood control problems at the Louisiana State Penitentiary at Angola, is inclosed (Incl 1).

3. Description of Study Area. The Louisiana State Penitentiary Levee study area is located on the left descending bank of the Mississippi River between river miles 294 and 310 above Head of Passes, in West Feliciana Parish about 50 miles northwest of Baton Rouge. The State Penitentiary comprises 19,428 acres of which approximately 16,240 acres are subject to potential Mississippi River overflow, the remainder being in the Tunica Hills above the Alluvial Plain. A locally constructed levee system provides partial protection to about 12,140 acres. The mainline levee provides about 30-year protection to 9,866 acres. The Monkey Island and Charity Lake levees provide a lesser degree of protection to 858 acres and 1,416 acres, respectively.

4. Economic Development. Within the mainline levee, about 4,850 acres are used for pastureland and 4,390 acres are used for cropland, with a net annual return of about \$859,000 (1980 price levels). The area within the Monkey Island and Charity Lake levees is used for cropland and pastureland with net annual returns of \$60,000 and \$7,000, respectively. As of 1976, the penitentiary buildings included 15 dormitories, mess hall, workshops, a hospital, and other support activities with a value of \$46,757,000 (1980 price levels) with additional facilities completed between 1976 and 1980 with a value of \$88,680,000. On-going work raises the total value of improvements at the penitentiary to \$141,677,000.

5. Existing Improvements.

a. Corps of Engineers. There are no existing Federal flood control improvements at the Louisiana State Penitentiary but several nearby features of the MR&T project affect the penitentiary and help reduce flood stages in the Mississippi River adjacent to the penitentiary. The Old River low sill and overbank structures, about 5 miles upstream, are designed to divert combined flood flows of up to approximately 630,000 cfs. The Morganza Control Structure, about 14 miles downstream, is capable of diverting about 600,000 cfs. These structures direct a substantial part of Mississippi River flood flows into the Atchafalaya Basin thereby reducing flood flows and stages on the river. The Old River Navigation Lock, located opposite the penitentiary at river mile 303, provides continued navigation between the Atchafalaya, Ouachita, Black and Red Rivers and the Mississippi River.

b. Non-Federal. The Department of Corrections of the Louisiana Department of Health and Human Resources owns the present levee system surrounding the penitentiary. The levee system was built primarily by inmate labor and not to grade or section specifications required for the Federal levee system. The local levee system consists of three levees: the main line levee which is 12.1 miles long and provides approximately 30-year protection to 9,866 acres; the Monkey Island levee, 2.9 miles long, provides approximately 3-year protection to 858 acres; and the Charity Lake levee, 4.7 miles long, which provides approximately 6-year protection to 1,416 acres. A two 6- by 6-foot concrete culvert gravity drainage structure and three electrical pumps with a total pumping capacity of 120,000 gallons

MRCPD-F

SUBJECT: Louisiana State Penitentiary Levee, Mississippi River (12087)

per minute are included for interior drainage. Water is pumped over the levee through two 36-inch diameter cast iron pipes.

6. Problems and Needs. The existing levee is deficient in both grade and cross-section. These deficiencies make failure a possibility during high-water season. It is estimated that a 30-year flood would be sufficient to cause failure. In the event of failure or the threat of failure, evacuation of the inmate population would be necessary. A stage of 60 feet NGVD (about 20-year flood) necessitates significant flood-fight efforts and with a forecast of a continued rising crest could result in an emergency evacuation. Finding an alternative location for housing and confining the prisoners would pose a formidable problem. The area also has seepage and interior drainage problems which can be detrimental to the crops inside the levee system during high water.

7. Improvements Desired. Local interests have asked that the local levee be incorporated in the Federal levee system, the maximum justifiable land area be protected, adequate interior drainage facilities be provided, and an access road between the ferry landing and the penitentiary be constructed.

8. Alternatives Considered. Structural alternatives considered included levees and floodwalls along existing levee alignments and along the Mississippi River's east bank to encompass the entire study area; construction of ring levees to increase protection of existing facilities; elevating or restricting future development to higher ground; and increasing pumping capacity to provide drainage relief. Non-structural alternatives considered included relocation of facilities subject to flood damage, flood proofing, flood-forecasting and evacuation plans, flood-fighting, and land-use measures.

9. Recommended Plan. The recommended plan consists of raising and strengthening the mainline levee to a maximum elevation of 71.5 feet NGVD with seepage berms where necessary. The levee would have a 10-foot crown with side slopes of 1 vertical on 5.5 horizontal on the land side and 1 vertical on 4 horizontal on the riverside. This would provide protection from the Project Design Flood with 4 feet of freeboard. The existing gravity drainage culverts would be replaced by two 6- by 6-foot concrete culverts with sliding vertical sluice gates. The pump discharge pipes would be modified to pass over the levee. No change in the pumps is contemplated. Any future modification of the pumps or pumping capacity would be a responsibility of local interests.

10. Economic Evaluation. Based on October 1981 price levels, the District Commander estimates the first cost of the recommended project to be \$21,100,000 of which, under conventional cost sharing for the MR&T Project, \$19,941,000 would be Federal and \$1,159,000 would be non-Federal. The annual charges, based on an interest rate of 7-5/8 percent and a 100-year period for economic analysis, are estimated at \$1,814,000 including operation and maintenance costs of \$15,000 annually. Average annual benefits from flood damage prevention are estimated at \$2,298,000, and the benefit-cost ratio is 1.3.

APPENDIX D

ENVIRONMENTAL RESOURCES

MRCPD-F

SUBJECT: Louisiana State Penitentiary Levee, Mississippi River (12087)

11. Project Effects. The recommended plan would have both beneficial and adverse impacts. Flood protection to agriculture and improvements would be increased reducing the likelihood of inmate evacuation and subsistence and hence the tremendous economic and social upheaval associated with evacuation. Approximately 5 acres of bottomland hardwoods, 1 acre of waterbodies and associated wetland and 345 acres of open land would be affected by levee construction and borrow pit excavation and about 345 acres of aquatic habitat would be created. The plan would have beneficial impacts to endangered species within the study area by creating open, deep-water areas providing suitable breeding habitat for the American alligator.

12. Recommendations of the Reporting Officer. The District Commander recommends incorporation of the mainline levee into the Federal levee system in accordance with the plan described in his report, subject to cost-sharing and financing arrangements which are satisfactory to the President and Congress.

13. Response to Public Notice. The New Orleans District Commander issued a public notice on 28 January 1982 stating his findings and recommendations and inviting public comment to the Mississippi River Commission. There were no responses.

Review of the Mississippi River Commission

14. General. The scope of the Commission's review encompassed the overall technical, economic and environmental aspects of the recommended plan. The report's conformance to the 14 December 1979 Water Resources Council's Principles and Standards was considered as well as the views of State and Federal agencies and local interests.

15. Findings and Conclusions. The Mississippi River Commission concurs in general with the findings and recommendations of the District Commander. The recommended plan is engineeringly and environmentally acceptable and economically justified. Total project first costs are estimated at \$21,100,000 based on October 1981 price levels. Average annual charges, based on the current interest rate of 7-5/8 percent and a 100-year period for economic analysis, are estimated at \$1,814,000. Average annual benefits are estimated at \$2,298,000, and the benefit-cost ratio is 1.3. Under traditional cost-sharing required by the 1928 Flood Control Act, non-Federal project responsibilities include: perform normal maintenance, accept any lands turned over to them, and provide without cost to the United States all rights-of-way for levee foundations and levees. The present administration is reviewing cost-sharing policy, but specific percentages regarding cost-sharing and financing have not been determined. The District Commander recommends construction subject to cost-sharing and financing arrangements, which are satisfactory to the President and the Congress. The Commission notes that implementation of the recommended plan could affect the Project Design Flood flowline by up to approximately 0.2 feet. This is not considered a significant impact that would necessitate an increase in levee grades opposite the recommended project. This matter will be investigated further during post-authorization detailed planning. The Commission also notes that the

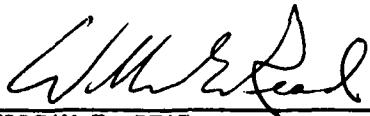
MRCPD-F


SUBJECT: Louisiana State Penitentiary Levee, Mississippi River (12087)

difference between the NED and LED (recommended) plans is limited to the location of borrow areas for levee construction and is conceptual in nature. The precise location of borrow areas is more appropriate for determination during post-authorization detailed planning. The Commission believes that no Federal funds should be expended for the preservation of environmental value unless the state provides assurances that these lands will be protected for that purpose. The Commission believes that the plan recommended by the District Commander will provide suitable flood protection to the Louisiana State Penitentiary and eliminate adverse social effects associated with prisoner evacuation and relocation. The Commission also believes that the recommended project is a proper added increment to the Mississippi River and Tributaries Project authorized by the Flood Control Act approved 15 May 1928, as amended.

16. Recommendations. The Mississippi River Commission recommends that the existing project, Mississippi River and Tributaries, authorized by the Flood Control Act approved 15 May 1928, as amended, be further modified to provide for flood control improvements at the Louisiana State Penitentiary, Mississippi River, generally in accordance with the plans of the reporting officer, with such modifications as in the discretion of the Chief of Engineers may be advisable, subject to cost-sharing and financing arrangements with the responsible non-Federal agencies sponsoring the project which are satisfactory to the President and the Congress.


1 Incl
NOD Rpt



WILLIAM E. READ
Major General, USA
President, Mississippi River Commission


ROY T. SESSUMS
Member


SAM E. ANGEL
Member


R. D. JAMES
Member


HUGH G. ROBINSON
Major General, USA
Member


R. S. KEM
Brigadier General, USA
Member

**LOUISIANA STATE PENITENTIARY LEVEE,
MISSISSIPPI RIVER**

FEASIBILITY REPORT

**APPENDIX D
ENVIRONMENTAL RESOURCES**

This appendix includes the following:

- SECTION I - BIOLOGICAL ASSESSMENT OF THREATENED AND ENDANGERED SPECIES**
- SECTION II - US FISH AND WILDLIFE SERVICE FISH AND WILDLIFE COORDINATION
ACT REPORT**
- SECTION III - CULTURAL RESOURCES**

AD-A126 747

LOUISIANA STATE PENITENTIARY LEVEE MISSISSIPPI RIVER
MAIN REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT
AND APPENDIXES(U) ARMY ENGINEER DISTRICT NEW ORLEANS LA
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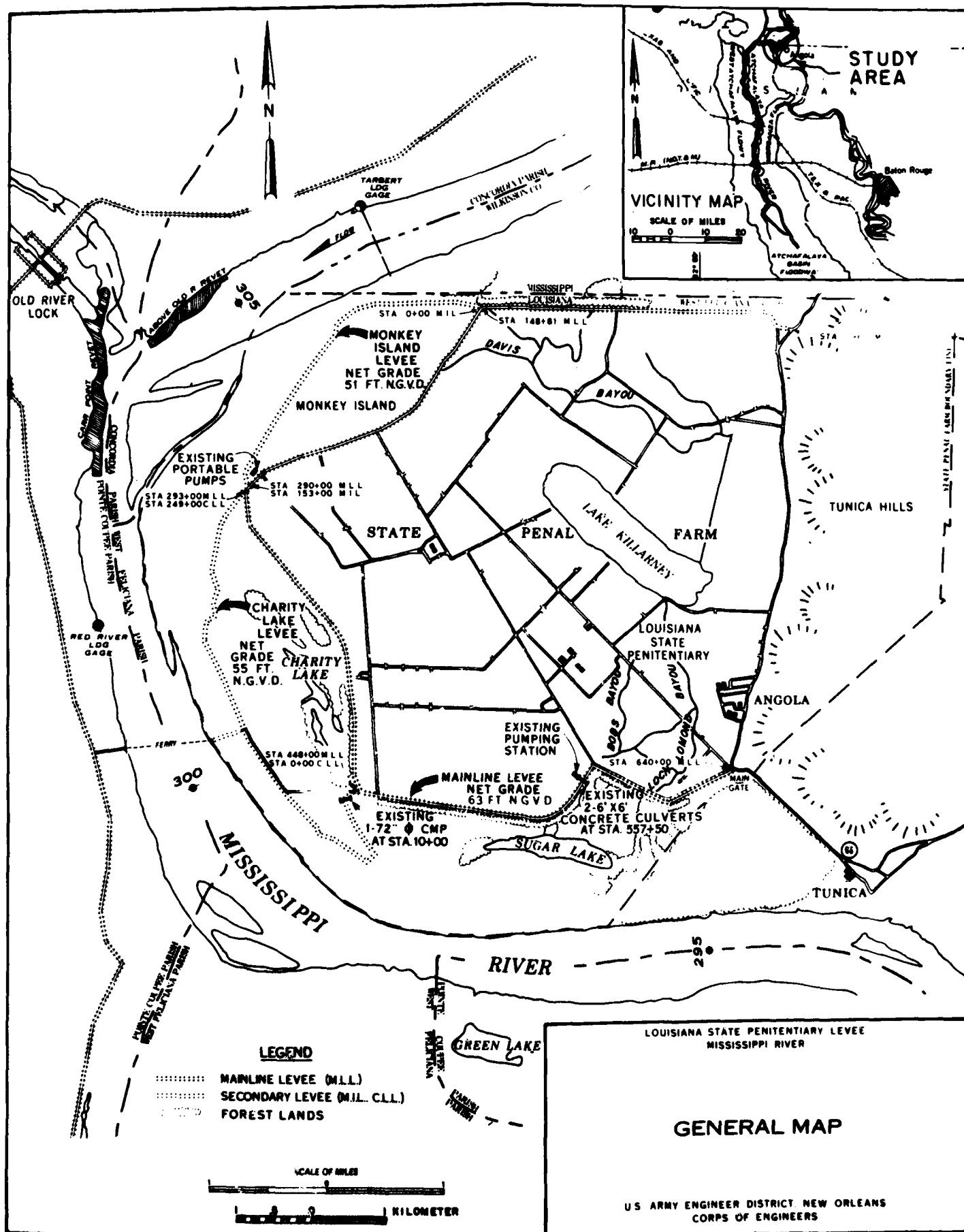
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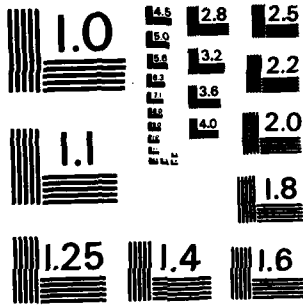
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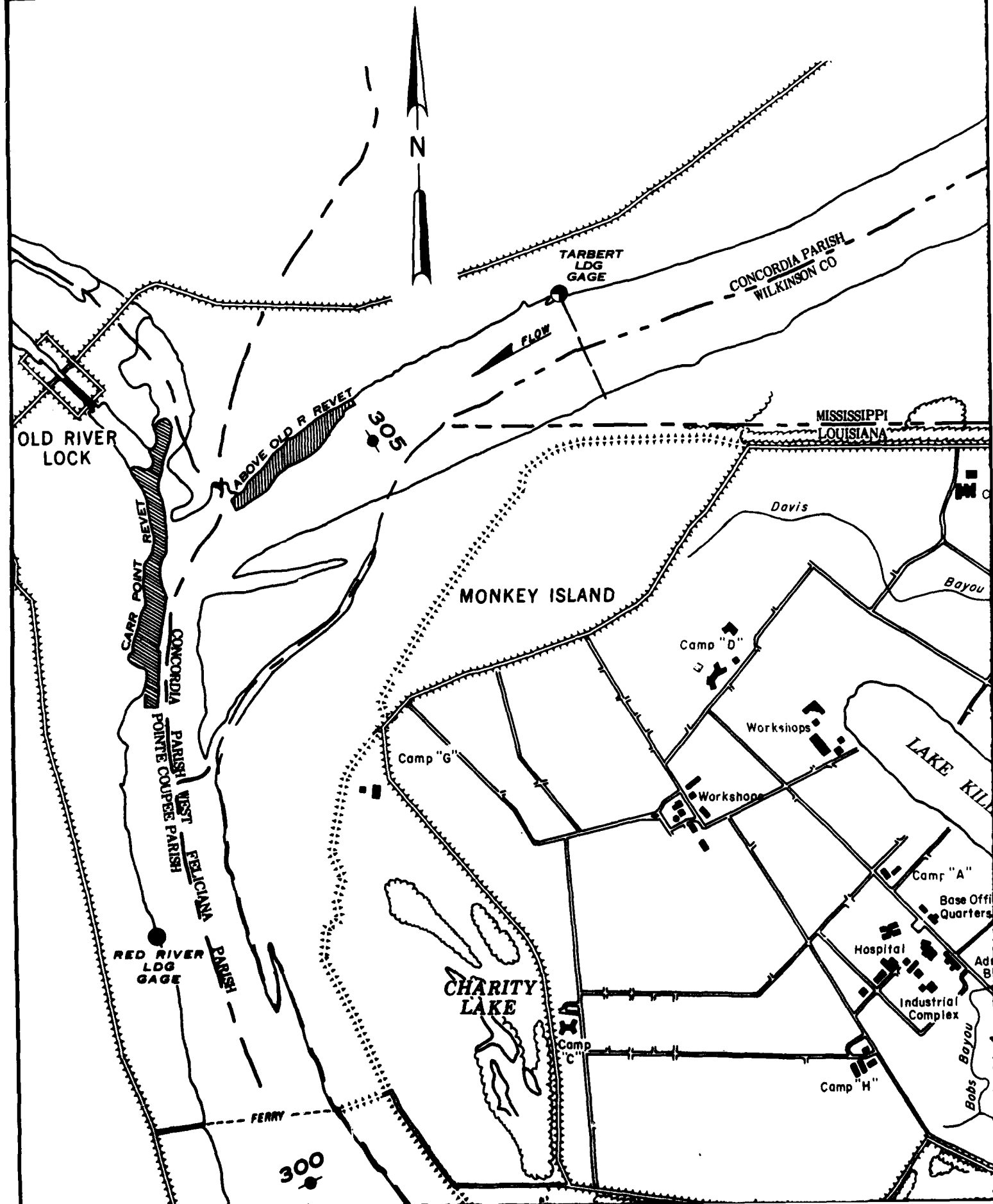




MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

SECTION I

Biological Assessment of
Threatened and Endangered Species



BIOLOGICAL ASSESSMENT OF THREATENED AND ENDANGERED SPECIES

LOUISIANA STATE PENITENTIARY LEVEE, MISSISSIPPI RIVER

PURPOSE

This assessment is submitted by the US Army Corps of Engineers, New Orleans District, in compliance with Section 7c of the Endangered Species Amendments of 1978. In a letter dated 4 January 1980, the Corps of Engineers requested information from the US Fish and Wildlife Service regarding threatened or endangered species within the Louisiana State Penitentiary Levee study area, located at Angola, Louisiana. The US Fish and Wildlife Service responded that the red-cockaded woodpecker [Picoides (Dendrocopos) borealis] and the American alligator (Alligator mississippiensis) may be present within this area.

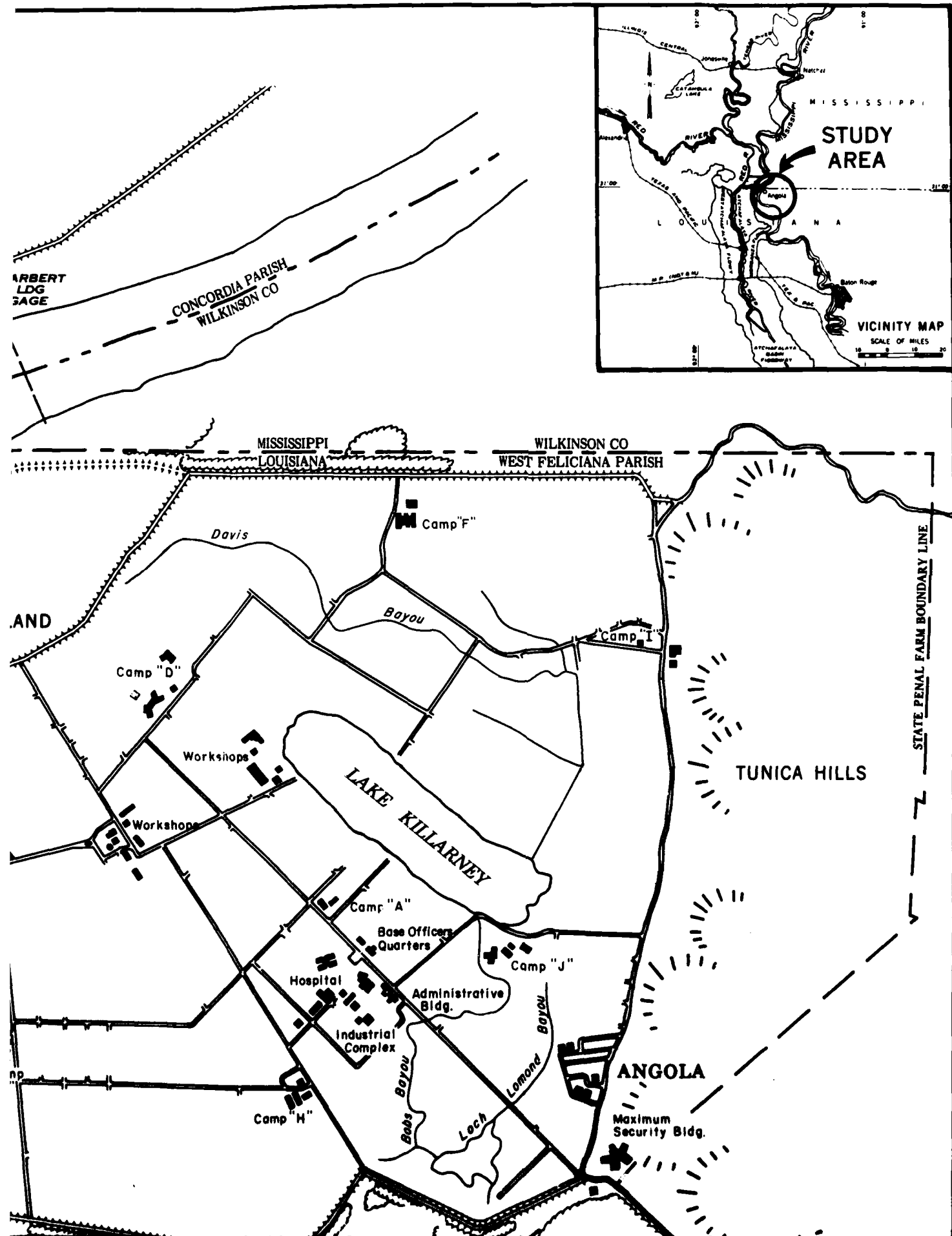
PROJECT SETTING

The study area is located on the left descending bank of the Mississippi River in West Feliciana Parish about 50 miles northwest of Baton Rouge. The study area totals approximately 19,430 acres. Within this area the mainline levee with a crown elevation of 63 feet National Geodetic Vertical Datum (NGVD)¹ provides flood protection for about 9,866 acres of the Angola state penal facilities. The area is relatively flat, lying in the Mississippi Alluvial Plain, and ground elevations vary from 40 to 55 feet NGVD. Approximately 1,400 acres of woodlands remain in the project area with the remainder being primarily cropland. There are approximately 740 acres of borrow pits, oxbows and natural lakes in the area.

RECOMMENDED PLAN

Studies were initiated to provide flood protection to the penal facilities and residents. This resulted in the formulation and analysis

¹ All elevations and stages in this report are in feet National Geodetic Vertical Datum (previously mean sea level) unless otherwise noted.



of seven structural plans as well as plans for evacuation and relocation. The evacuation and relocation plans are very unlikely to be recommended due to strong public opposition. The mainline levee plan is the least environmentally damaging plan of the structural plans considered. The plan described as the "most likely candidate" for recommendation consists of raising and strengthening the mainline levee to a height of 71.5 feet. Included in the plan is the replacement of an existing pair of 6- by 6-foot culverts through the levee with two new 6- by 6-foot concrete culverts with sliding vertical sluice gates.² The material to be used for increasing the height of the levee will be excavated from a borrow area to be located on the river side and parallel to the existing levee. The borrow area is planned to be no closer than 650 feet from the centerline of the existing levee. Dimensions of the borrow area would typically be 10 feet deep and 285 feet wide. The actual dimensions of the borrow area may vary in some locations in order to avoid forested areas and wetlands. Sides of the borrow pit would be graded to 1 on 3 slopes typically; however, some segments may be graded down to 1 on 6, or slopes between, for environmental enhancement.

CUMULATIVE IMPACTS

A comprehensive survey of the study area revealed that the red-cockaded woodpecker [Picoides (Dendrocopos) borealis] is not present; however, the American alligator (Alligator mississippiensis) is present in the immediate study area. The Louisiana Department of Wildlife and Fisheries reports that the red-cockaded woodpecker is found in West Feliciana Parish but not in the study area and attributes this to the lack of suitable habitat. That agency reports that the American alligator is definitely present in Sugar Lake and probably in other lakes within the project area. West Feliciana Parish, according to Louisiana studies, is estimated to have a population of approximately 38 alligators per square mile of alligator habitat.

² Type of culverts in this plan revised approximately 1 Sep 80 from type originally indicated in assessment.

Studies indicate that the project as proposed will not impact the red-cockaded woodpecker due to the complete absence of suitable habitat. The American alligator will be impacted beneficially by the project as proposed due to the creation of approximately 345 acres of aquatic habitat.

Studies indicate that the project as proposed will have no cumulative effects upon the red-cockaded woodpecker. The cumulative effects of the proposed project upon the American alligator would be beneficial. The deepwater habitat created as a result of borrow excavation would be used by alligators during courtship and breeding. The filling of the existing borrow pit in some areas as required by planned levee construction would deprive alligators of specific existing available habitat. The habitat to be created, however, would be much more extensive than the existing habitat and would furnish increased provisions for the alligator's life requirements. The replacement drainage structures through the levees are considered to be hydraulically equivalent to the existing structures; therefore, no impact should occur to existing interior wetland habitat.

STUDY METHODS AND DIFFICULTIES

The study methods used in this report were literature review, personal communication with experts in the field, "on the ground" reconnaissance of the study area, and correspondence with officials of the Louisiana Department of Wildlife and Fisheries.

No difficulties were encountered during the study process and data were obtained with a reasonable amount of effort to prepare the assessment.

CONCLUSIONS

In conclusion, it is determined that the implementation of the project as proposed will have no adverse effects upon any listed species or their critical habitat.



SECTION II

US Fish and Wildlife Service
Fish and Wildlife Coordination Act Report

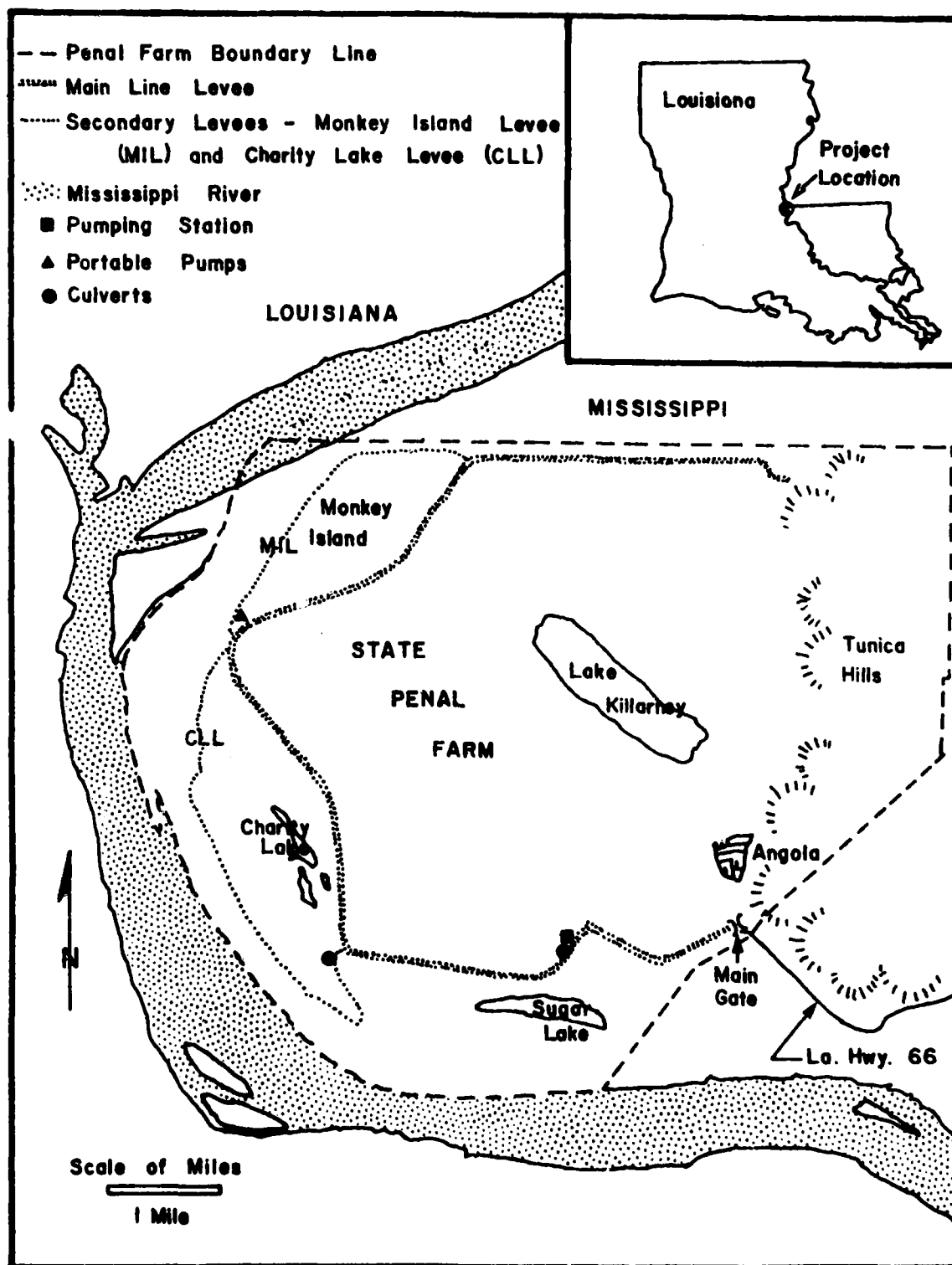
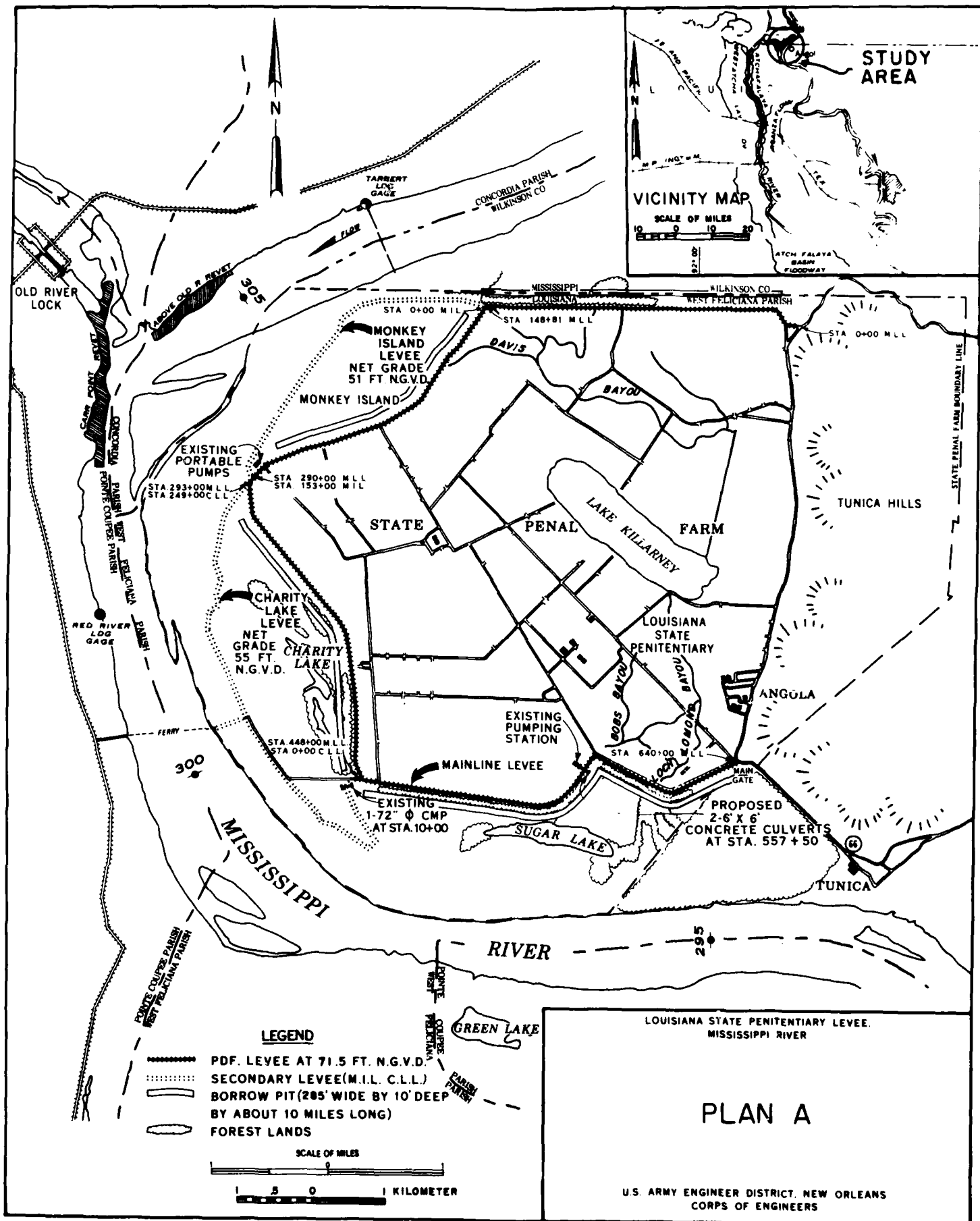


Figure 1. Louisiana State Penitentiary, West Feliciana Parish, Vicinity Map.





**UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE**

200 EAST PASCAGOULA STREET, SUITE 300

JACKSON, MISSISSIPPI 39201

December 14, 1981

18 DEC 1981

District Engineer
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Sir:

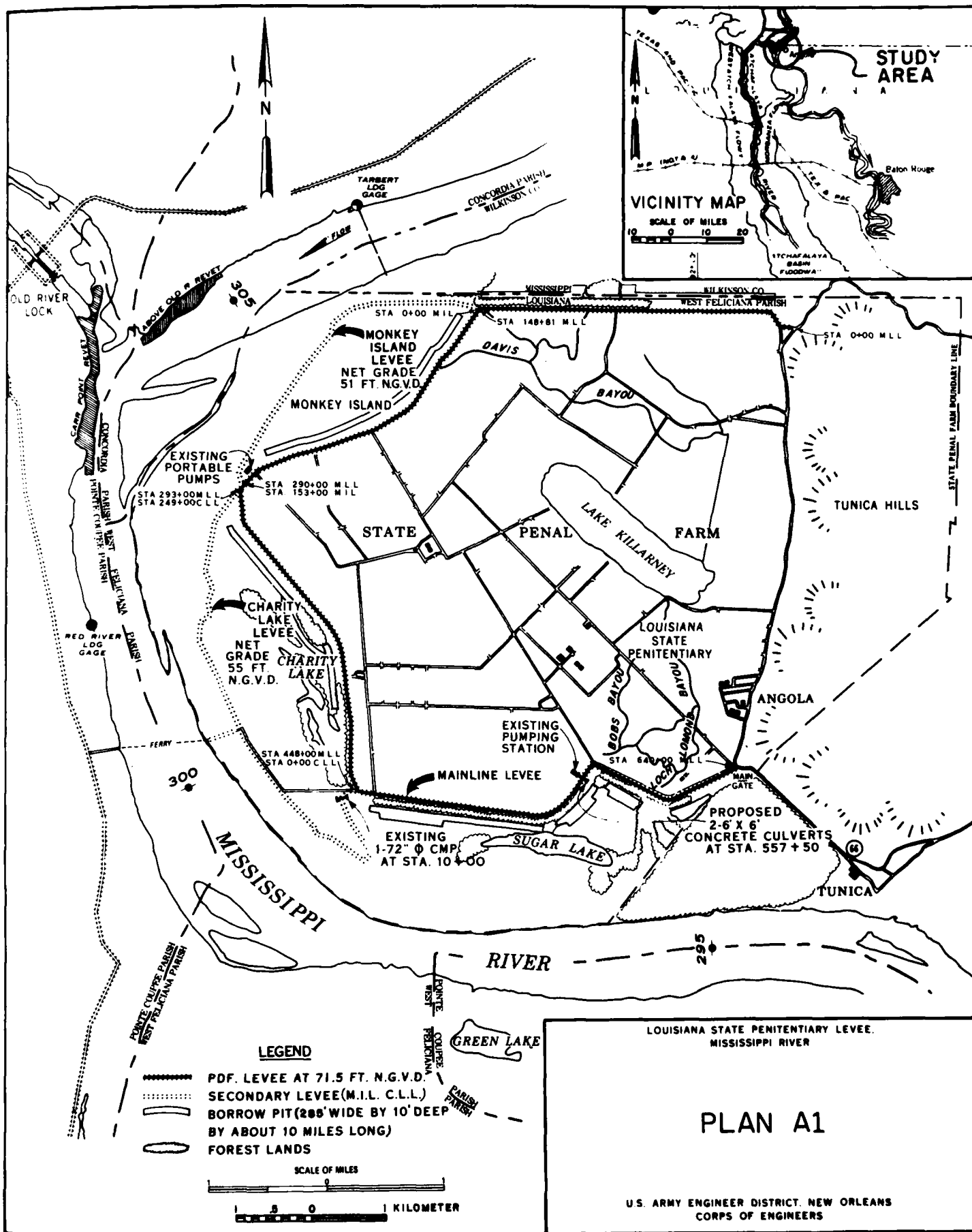
Reference is made to the study "Louisiana State Penitentiary Levee, Mississippi River", being conducted under the leadership of the New Orleans District Corps of Engineers (NODCE). The study was authorized by a resolution of the Committee on Public Works of the United States Senate on September 5, 1973, which requested that the Chief of Engineers (Department of the Army) determine the advisability of incorporating the existing local levee at the Louisiana State Penitentiary into the Federal mainline levee system. According to members of your staff, you plan to recommend raising and strengthening the mainline levee in the project area as part of the Federal mainline levee system. This letter represents the final report of the Fish and Wildlife Service on the proposed project, and is submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

DESCRIPTION OF AREA

The Louisiana State Penitentiary (LSP) at Angola encompasses approximately 19,400 acres on the left descending bank of the Mississippi River in West Feliciana Parish, Louisiana. The penal farm is bounded by the Mississippi River to the south and the west, and the Louisiana-Mississippi state line to the north; the eastern boundary runs through the Tunica Hills (Figure 1).

The LSP can be divided into two distinct geographic regions: the Mississippi River Alluvial Plain and the Tunica Hills. The latter region is a distinct physiographic province known as the "loess hills" (Delcourt and Delcourt, 1974).

Considerable land use changes have occurred within the study area. A study (delcourt and Delcourt, 1974), utilizing an early American Land office survey as a basis, indicated that the Mississippi River Alluvial Plain in the project area once consisted of baldcypress-tupelogum swamp. Through levee construction and natural alluviation, approximately 9,900 acres of the alluvial plain within the project area have been



protected from river overflow. An additional 2,280 acres in the Charity Lake and Monkey Island areas are also protected by levees but do receive occasional flood waters.

Approximately 9,900 acres of the penal farm are encircled by 12.1 miles of mainline levee (ML). This levee, at a height of 64 feet National Geodetic Vertical Datum (NGVD), provides the only significant flood protection for the prison. Drainage channels and Lake Killarney located within the ML collect excess water, which is discharged into Sugar Lake outside the ML via culverts and an adjacent pumping station. Sugar Lake is linked to the Mississippi River by Sugar Lake Bayou.

Two secondary levees adjoin the ML. The Monkey Island Levee (MIL), at a net grade of 51 feet NGVD, provides some flood protection to 860 acres of cropland. Drainage is accomplished by portable pumps or removal of a portion of the levee at its lower end. The Charity Lake Levee (CLL), at an elevation of 55 feet NGVD, provides protection to 1,420 acres of land (primarily pasture). This area is drained by a gated culvert that remains open at river stages below 36 feet NGVD. The area has no drainage when river stages exceed 36 feet NGVD.

PROJECT DESCRIPTION

According to information contained in the Draft Main Report the plan tentatively selected for recommendation to your higher authority is Plan A1. This plan consists of raising and strengthening the ML to a maximum height 71.5 feet National Geodetic Vertical Datum (NGVD). This would be accomplished by levee enlargement on the riverside or landside of the existing levee, with seepage berms to be provided where seepage has been observed. The levee would have a 10-foot crown width with side slopes of 1 vertical on 5.5 horizontal on the landside and 1 vertical on 4 horizontal on the riverside. This would provide protection from the standard project flood with 4 feet of freeboard. The existing pair of concrete culverts (6 feet by 6 feet) located in the ML would be replaced with two new 6-by 6-foot concrete culverts with vertical sluice gates. Modifications will be required in two 36-inch diameter pipes which transport water from the pumping station near Sugar Lake and over the ML, so that these pipes will pass over the top of the new levee.

The recommended plan includes measures to reduce adverse environmental impacts. Levee enlargement will be accomplished on the landside of the ML where existing borrow pits adjoin the riverside of the levee. Fill material will be obtained from new borrow pits parallel to and along the riverside of the levee. Extra care will be taken to avoid bottom-land hardwoods and wetlands along Charity and Sugar Lakes when excavating the new borrow pits. The ML will also be constructed so that wetlands and existing borrow pits hydrologically connected to Charity or Sugar Lakes will not be affected by fill placement.

FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

Description of Habitat

The LSP penal farm has several wildlife habitat types present. Mixed hardwoods are found in the ravines and river lowlands of the Tunica Hills (Delcourt and Delcourt, 1974). Habitat types found in the Mississippi River floodplain include bottomland hardwoods (Palustrine forested wetlands; Cowardin et al., 1979), pastures, cropland, large open water areas such as Sugar and Killarney Lakes (Lacustrine limnetic, Lacustrine littoral; Cowardin et al., 1979), and smaller open water areas such as Charity Lake, small ponds, and borrow pits (Palustrine open water). The mixed hardwoods of the Tunica Hills are vegetated with Carolina beech, white ash, southern magnolia, white oak and Shumard oak. The herbaceous understory consists primarily of phlox, may apple, Christmas fern, and bellwort (Allen et al., 1975).

The bottomland hardwoods are mainly located outside the ML. Overstory vegetation includes hackberry, eastern cottonwood, box elder, green ash, bitter pecan, honeylocust, waterlocust, baldcypress, and water oak. Typical understory plants include swamp privet, greenbriars, rattan vine, hawthorne, butterweed, and Cyperus spp.

Agricultural land (pasture and cropland) comprises the most extensive habitat type in the LSP. Principal crops include soybeans, cotton, sorghum, corn, and various truck crops. Cattle graze on the pasturelands.

The largest open water area is the 430-acre Lake Killarney, located within the ML. Other open waters include Sugar and Charity Lakes, borrow pits, and small ponds. Aquatic vegetation such as floating water primrose and duckweed are common in these waters. Swamp privet is commonly found in association with the borrow areas.

Fishery Resources

The fishery resources of the study area are limited to Lake Killarney, Sugar Lake, Charity Lake, and several borrow pits and small ponds. Fishes expected to occur in the 430-acre Lake Killarney include largemouth bass, black crappie, white crappie, warmouth, bluegill, channel catfish, yellow bullhead, bowfin, spotted gar, carp, gizzard shad, pirate perch, mosquito-fish, and several minnow species. Sport fishing is allowed, with employees of the LSP being the major participants.

Sugar Lake comprises approximately 100 acres, and is connected to the Mississippi River via Sugar Lake Bayou. During high water periods this area provides feeding, spawning, and nursery habitat to numerous species of fish common to the Mississippi River. Species known to commonly occur in the river and expected to occur in Sugar Lake include largemouth bass, black crappie, white crappie, spotted gar, longnose gar, shortnose gar, skipjack herring, gizzard shad, threadfin shad, carp, river carpsucker,

APPENDIX A

PROBLEM IDENTIFICATION

smallmouth buffalo, bigmouth buffalo, blue catfish, channel catfish, flat-head catfish, and freshwater drum.

Charity Lake and the borrow pits and sloughs of the study area provide limited fish habitat. These water bodies experience drastic water fluctuations in response to varying climatic conditions and river stages, and experience chronic high turbidity levels. Small populations of yellow bullhead, black bullhead, carp, bowfin, shortnose gar, green sunfish, and mosquitofish are expected to occur in these waters.

Agricultural lands are generally of less value to wildlife than areas supporting native vegetation. However, significant use by some wildlife species occurs. Mourning doves are favored by extensive farming operations where large acreages of soybeans and grain crops are harvested mechanically. Nearby water and suitable nesting habitat make this part of the study area ideal for doves. This area also supplies limited feeding habitat for American woodcock. Eastern cottontail, numerous rodents, cattle egret, bobwhite, eastern meadowlark, and northern shrike utilize agricultural lands throughout the year.

Game mammals associated with bottomland hardwoods include white-tailed deer, swamp rabbit, raccoon, gray squirrel, and fox squirrel. Furbearers present are beaver, mink, gray fox, bobcat, opossum, and possibly nutria. Wood ducks and mallards are expected to utilize the seasonally flooded bottomland hardwoods. Other game birds expected in these wetlands include American woodcock, wild turkey, bobwhite, and mourning dove. Non-game species such as small mammals, raptors, songbirds, reptiles, and amphibians are also believed to be common in this area.

The open water (lakes, borrow pits, sloughs, and ponds) and associated riparian vegetation of the study area support wading birds such as great egret, cattle egret, great blue heron, little blue heron, and green heron. These areas also provide resting habitat to migratory waterfowl such as mallard, northern pintail, green-winged teal, blue-winged teal, gadwall, American wigeon, and lesser scaup. The American alligator occurs in open waters and associated riparian areas of the study area. This species is presently classified by the Department of the Interior as threatened by similarity of appearance in the area. The red-cockaded woodpecker, usually found in mature, open pine forests, may occur in a portion of the study area.

FISH AND WILDLIFE RESOURCES WITH THE PROJECT

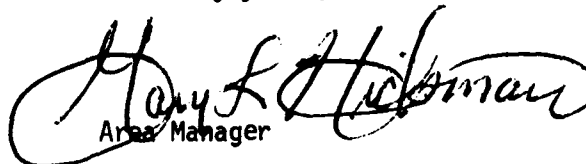
Fishery Resources

Approximately 345 acres of cropland and pasture will be converted to borrow pits with the tentatively selected plan. With proper design and stocking, it is possible that the borrow pits would support significant populations of fishes such as largemouth bass, bluegill, and channel catfish. This would depend on maintenance of adequate water levels during periods of

A review draft of this report was provided to the Louisiana Department of Wildlife and Fisheries and the National Marine Fisheries Service. Copies of letters of comment received are attached.

Your cooperation in this matter is appreciated..

Sincerely yours,


Area Manager

Attachment

APPENDIX A

PROBLEM IDENTIFICATION

This appendix contains information on the study; on present and future conditions in the study area; on problems, needs, and opportunities relative to flood control in the area; and on the planning objectives.

STUDY AUTHORITY

This report is made in compliance with the provisions of the resolution presented below. The resolution was adopted on 5 September 1973, by the Committee on Public Works of the United States Senate at the request of Senator Russell B. Long of Louisiana. The resolution reads as follows:

"RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Chief of Engineers, Department of the Army, is hereby requested to review the report on the Mississippi River and Tributaries' Project, published as House Document 308 of the Eighty-eighth Congress, and other pertinent reports, with a view to determining whether incorporating the local levee at the Louisiana State Penitentiary into the Federal levee system is advisable."

PRIOR STUDIES AND STUDIES OF OTHERS

A US Army Corps of Engineers study was begun by a draft detailed project report, entitled "Angola Levee, Louisiana," submitted 3 May 1965, under authority of Section 205 of the 1948 Flood Control Act, as amended. The main concern of the report was the proposed construction of a levee and drainage structure around the lands immediately adjacent to

State of Louisiana



JESSE J. GUIDRY
SECRETARY

DEPARTMENT OF WILDLIFE AND FISHERIES

400 ROYAL STREET
NEW ORLEANS 70130

504/342-5864

DAVID C. TREEN
GOVERNOR

October 30, 1981

Mr. Dave Fruge'
U.S. Fish and Wildlife Service
P.O. Box 4305
Lafayette, La. 70502

RE: Louisiana State Penitentiary Levee,
Mississippi River, Coordination Act Report

Dear Mr. Fruge':

We have reviewed the above referenced document and we concur with your assessment and recommendations. We have also informed the Corps that we favor implementation of Plan A1.

Sincerely,

Jesse J. Guidry
Jesse J. Guidry
Secretary

JJG:MBW:cgd

Sugar Lake, south of the penal farm proper. The proposed levee grade would have provided a 2-foot freeboard above the 10-year flood. The report was favorable; however, the final detailed project report was terminated due to the unwillingness on the part of the local interest to provide the required cooperation at that time. Due to the limited scope of the study covered in the report, it was of minimal use to the present planning effort.

EXISTING CONDITIONS

A broad description of the existing conditions made as part of the problem identification task is presented in the subsequent paragraphs.

ENVIRONMENTAL SETTING

The Louisiana State Penitentiary at Angola comprises 19,428 acres of which approximately 16,240 acres could be impacted by project work depending on the chosen course of action. The Tunica Hills, on the eastern portion of the property, will not be materially affected because of their elevation above the flood-prone area. The study area lies in the Mississippi Alluvial Plain, and is protected from Mississippi River floods by the existing non-Federal levees. The majority of the land is agricultural with ground surface elevations ranging from 40 to 55 feet National Geodetic Vertical Datum (NGVD).¹

The prison compound is encircled by approximately 12.1 miles of mainline levee which abuts the Tunica Hills on the east. This non-Federal levee was originally built to a net elevation of 63 feet, and provides the only significant flood protection for the 15.3 square miles

¹All elevations and stages in this report are in feet National Geodetic Vertical Datum (previously mean sea level) unless otherwise noted.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Environmental Assessment Branch
4700 Avenue U
Galveston, TX 77550

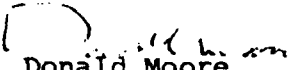
November 6, 1981 F/SER612/PK
713/766-3699

Mr. David Fruge
Acting Field Supervisor
U.S. Fish & Wildlife Service
Division of Ecological Svcs.
Post Office Box 4305
Lafayette, LA 70501

Dear Mr. Fruge:

We have reviewed the preliminary draft of the proposed Fish and Wildlife Service report on the study, "Louisiana State Penitentiary Levee, Mississippi River." Since we anticipate that any adverse effects that might occur on marine and anadromous fishery resources would be minimal, we therefore, have no suggestions to offer on the report.

Sincerely,


Donald Moore
Area Supervisor



10TH ANNIVERSARY 1970-1980
National Oceanic and Atmospheric Administration
A young agency with a historic
tradition of service to the Nation

of the penal facilities. Interior drainage is collected in Lake Killarney and along drainage channels and is discharged into Sugar Lake through a double barrel 6- by 6-foot concrete culvert equipped with flap gates or by an adjacent pumping station located in the southern part of the levee.

Two secondary levees, also built by non-Federal interests, are found in the study area. Monkey Island levee, with a net grade of 51 feet, provides minor protection to 858 acres of land used for the cultivation of soybeans and corn. This levee is located on the northwestern part of the study area between the penal farm and the river. Prior to river stages reaching 36 feet, the inclosed area is drained by removing a section of the levee at the lower end; thereafter, the area is drained by portable pumps. Charity Lake levee has a net grade of 55 feet and provides minor protection to about 1,416 acres of pasturelands located on the southwest end of the farm. Rainfall runoff is drained by a 72-inch gated drainage pipe which is closed when river stages reach 36 feet; thereafter, the area cannot be drained until river stages recede below the elevation of water ponded in the interior.

CLIMATE

GENERAL

The project is located in a humid subtropical latitude, but is subject to significant polar influences during winter, as masses of cold air periodically move southward across the plains and Mississippi Valley, displacing warm moist air. Prevailing wind flow is from a southerly direction during much of the year. This movement of maritime air from the Gulf of Mexico helps to temper extremes of summer heat, to shorten the duration of winter cold spells and provides a source of abundant moisture and rainfall. Winds are usually rather light. About 80 percent of hourly wind speed observations during the year are 12 mph or less.

SECTION III

Cultural Resources

TEMPERATURE

Based on National Weather Service records for Woodville, Mississippi, Angola, Bunkie, and Melville, Louisiana, the extreme recorded temperatures are 8°F. on 12 January 1918 and 109°F. on 15 June 1918, both occurring at Angola. The normal monthly temperatures range from 52.6°F. in January to 82.5°F. in July. The monthly normals for the period of record 1941 to 1970 at Melville, Louisiana, are given below:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
51.8	54.6	60.1	68.3	74.4	79.9	81.7	81.4	77.0	68.0	58.9	53.6

RAINFALL

Precipitation generally occurs in the form of showers from about mid-June to mid-September and as heavy winter rains from mid-December to mid-March. Based on records from the National Weather Service at Simmesport, Louisiana, approximately 8 miles west of the project, the maximum annual rainfall of 83.87 inches occurred in 1973; the minimum annual was 38.08 inches in 1951. The normal annual precipitation is 59.67 inches. The maximum monthly rainfall of 22.42 inches occurred in May 1953; the minimum of 0.11 inches occurred in October 1940 and again in October 1952. Normal monthly precipitation, based on the Simmesport gage data, ranges from 6.18 inches in December to 3.31 inches in October. Monthly normals for the period of record 1941 to 1970 are given below:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
5.52	4.99	5.92	5.64	5.87	4.53	5.15	4.40	3.75	3.31	4.41	6.18

NATURAL RESOURCES

The natural resources within the study area find their sources in the Mississippi River, marshes, swamps, and woodlands typical of the area. Some scattered areas of bottomland hardwoods have survived clearing and are of significant value to wildlife. Other forested areas are

CULTURAL RESOURCES

Very little is known about prehistoric use of the flood plain at this location. Site 16WF3, Angola Gate Mound, is tentatively identified as a Poverty Point site, but has not been tested. During the historic period the site was used as a cemetery. Site 16WF21, located on the rolling terrace east of Davis Bayou, may be the only other prehistoric site now recorded within project boundaries. Sequential reconstruction of the present drainage system would be a helpful tool in predicting the probability of finding prehistoric flood plain sites.

A great deal more is known about the protohistoric period. Ethnographic sources indicate that the area was occupied by a series of aboriginal groups. DeSoto's expedition of 1541-1542 was the first European force to visit the vicinity. DeSoto was reportedly buried in the Mississippi River near its confluence with the Red. French explorers and missionaries frequented the area from the mid to late 17th century. Indian groups actively participated in the European conflict for control of the river.

References to the project area appear in the journals of such explorers as LaSalle and Tonti as early as 1682. In 1699, Pierre LeMoyne, Sieur d'Iberville, visited Houma Indians who were settled on the bluff above the project area. Iberville erected a large cross near the relict channel presently known as Lake Killarney. Through time the lake has been called Lake of the Tunica, Lake of the Cross, and Lake Angola. The land below the bluffs was known throughout the 18th century as the Portage of the Cross.

In 1700 a French Jesuit, Father Paul du Rhu, built a chapel in the vicinity of Tunica, Louisiana. Father du Rhu was followed by Father de Limoges who established a mission for the purpose of converting and trading with the Houma Indians. According to site files located in the state Archeologist's Office, the first Catholic Church site in the lower Mississippi River Valley is located on the bluff near Lake Killarney.

in an earlier stage of succession and are of less value to wildlife. Common small game animals in the area include squirrel, bobwhite quail, mourning dove, and cottontail rabbit. Common furbearing animals within the area include mink, otter, muskrat, raccoon, skunk, beaver, opossum, fox, and bobcat. Study area lakes and borrow pits support a variety of fish species; however, the species most popular are white and black crappie.

CULTURAL RESOURCES

The National Register of Historic Places, as published in yearly and weekly supplements of the "Federal Register," was consulted through 23 June 1981. The closest National Register property to the project is Trudeau Landing, east of the community of Tunica, Louisiana. It is well outside the study boundaries and will not be affected by the proposed levee improvements. At least five prehistoric, protohistoric and historic sites (16WF 14, 15, 16, 21, and 28) are located on the bluff overlooking the penitentiary. Site 16WF1, an historic Tunica village, is located south of the proposed borrow pit closest to the main gate. This site has been previously disturbed by construction of Highway 66 and the penitentiary hospital. Additional known sites within prison boundaries are 16WF3, a possible Poverty Point mound and historic cemetery just north of the main gate, and 16WF2, a probable Houma village dating from 1680 to 1708 on the natural levee east of Lake Killarney.

The Louisiana State penal farm and the town of Angola are cultural islands for all practical purposes. The town exists solely as a residence for the facility employees and their families.

RECREATION

Public accessibility to the study area is restricted to the use of Lake Killarney only and on a very limited basis due to the nature of the facility. Additional recreation is afforded from the occasional fishing in Sugar Lake and other surrounding lakes, bayous, and borrow pits by the penitentiary employees and their dependents.

During this same period aboriginal groups allied with English and French forces and actively fought other aboriginal groups of opposite allegiance. The Tunica, allies of the French, were driven from their settlements on the Yazoo River by the Chickasaw. In 1706, they moved to the project area and eventually killed or drove off the Houma. The Tunica controlled the access to the Red River and the trade of salt and horses. The Tunica quickly abandoned the bluff settlements of the Houma and founded at least two flood plain villages (within project boundaries) at either end of the Portage of the Cross. Site 16WF2, the Angola Farm site, has been identified as the northernmost village of this pair. Site 16WF1, the Tunica Village site, which is located beneath Highway 66 just south of the Penitentiary main gate, may be the southernmost village of this pair. Following a skirmish in 1731 at Angola farm with visiting Natchez warriors (English allies), the Tunica moved south to Trudeau Landing to be closer to French forces. Trudeau Landing (16FW25) is the only site in the project vicinity which is listed on the National Register of Historic Places. It is east of the community of Tunica, Louisiana, and outside the project area. Between 1784 and 1803, the Tunica purchased land from the Avoyel and moved to a permanent home at Marksville, Louisiana.

The 19th century is memorable for the marked increase in Man's effort to change his environment. In 1831, Captain Henry M. Shreve engineered the dredging of a shortcut channel along the northern edge of the project area. A similar cutoff was made in 1848 by Raccourci along the southern edge of the project area, forming Raccourci Island. What was once a double meander loop was simplified to a large bend, eliminating miles of navigation channel. An inventory of 19th century wrecks in this reach of channel between miles 311.9 and 299.4 includes 13 wrecks between the years 1830 and 1868. The inventory is published in Appendix AB, Volume II of the Environmental Assessment of the Mississippi River, Cairo, Illinois to Venice, Louisiana (1973). During the Civil War the area was the site of several small skirmishes between Union and Confederate forces. In March 1864, a Union fleet assembled downstream in preparation for the conquest of the Red River. On the Mississippi River Commission hydrologic survey maps of 1879, the project area is identified as Angola Plantation. The State of Louisiana

GEOLOGICAL CONDITIONS

The study area is located on the eastern edge of the lower Mississippi Alluvial Plain and is bounded on the north, west, and south by the Mississippi River. On the east side, the study area is bounded by the Tunica Hills, which consist of Tertiary sediments capped by Quaternary aged upland deposits. The Louisiana State Penitentiary lies on 150 to 200 feet of Holocene alluvial deposits. The area is of low relief with ridges and swales typical of point bar topography. Several small lakes or ponds exist in the swales in addition to the large oxbow, Lake Killarney. Elevations range from 25 feet along the river to 55 feet along the natural levees and 63 feet along the manmade levees.

DEVELOPMENT AND ECONOMY

Approximately 16,240 acres of the 19,428 acres in the study area are subject to potential Mississippi River overflow. Of the area subject to overflow, about 4,100 acres located adjacent to the Mississippi River are unprotected and largely undeveloped. The remaining 12,140 acres are partially protected by a locally constructed and maintained levee system.

The mainline levee, which ties into the hills on the east, was built to an elevation that should provide 100-year protection to the 9,866 acres it incloses. However, it was not built to Federal standards and would require extensive flood fight efforts to contain a 100-year flood. Within the mainline levee, about 4,850 acres are used for pastureland and 4,390 acres are used for croplands. The net annual return on these lands is \$859,000 (1980 price levels).² Approximately 1,000 acres of pasturelands and 500 acres of croplands in the northern

²All prices in this report are 1980 price levels.

purchased the property in 1890 and developed the existing penal institution to replace an older facility in Baton Rouge.

To date, there has been no systematic survey of the flood plain or bluffs immediately east of the project boundaries. Investigations have been conducted at several sites. James A. Ford excavated portions of sites 16WF1 (Tunica Village site), 16WF2 (Angola Farm site), 16WF3 (Angola Gate Mound) between 1934 and 1937. William Haag returned to 16WF3 in 1970 and investigated 16WF14, a protohistoric midden on the bluff east of Lake Killarney, in 1964. Jeffery P. Brain conducted additional excavations at 16WF2 in the 1970's.

portion of the prison compound are subject to seepage and drainage problems during the yearly spring high water stages of the river.

As of 1976, the penitentiary buildings included 15 dormitories, a mess hall, workshops, a hospital, stores, schools and administration buildings. There are also a number of storage buildings and support facilities such as the laundries and power plants.

The estimated value of existing improvements subject to potential flood damages within the mainline levee is \$135.4 million; ongoing construction is expected to increase the value of such improvements to \$141.7 million. It is projected that the present inmate population of 4,200 will reach 4,500 in the near future and remain stable at that level thereafter. The current employee complement at the Angola complex is around 1,700. Of these, approximately 600 live within the compound, while the balance commute from outlying communities. In addition, there are over 300 employee dependents living within the prison compound.

The Monkey Island and Charity Lake areas are inclosed by secondary levees which tie into the mainline levee. The 2.9-mile long Monkey Island levee provides about 3-year protection to the 858 acres of cropland it incloses. The 4.7-mile long Charity Lake levee provides about 6-year protection to the 1,416 acres of pasturelands it incloses. These two areas have net annual returns of \$60,000 and \$7,000, respectively. It is expected that the current land use pattern within the study area will remain stable within the foreseeable future.

Transportation routes into the study area include a ferry crossing on the Mississippi River near mile 300.5 above Head of Passes, Louisiana Highway 66 southeast from Tunica, and an unnumbered rural road from the northeast that connects with Highway 66.

STATUS OF EXISTING PLANS AND IMPROVEMENTS

FEDERAL

Congress approved a comprehensive plan for flood control in the Mississippi River Valley by passage of the Flood Control Act of 1928. Part of this flood control act provided for construction of an extensive levee system. On the west bank, the Mississippi River levee system extends from Allenville, Missouri, on the Little River diversion channel, generally southward to the vicinity of Venice, Louisiana. On the east bank, the levee system extends from Hickman, Kentucky, to Bohemia, Louisiana, except where interrupted by hills and tributary streams.

The design flowline applicable to the area of study is that presented in the "Refined 1973 MR&T Project Flood Flowline" (New Orleans District), June 1978.

The Old River low sill and overbank structures are located on the west bank of the Mississippi River at approximately mile 315 above Head of Passes. The Old River low sill structure is a gated control structure consisting of 11 bays (44 feet/bay) with weir elevations of 10 feet in the four outer bays on each side and minus 5 feet in the three center bays. The structure is operated to distribute flows between the Mississippi and Atchafalaya Rivers at all stages. The overbank structure is a flood control structure consisting of 73 bays (44 feet/bay), with a weir elevation of 52 feet. The Old River low sill and overbank structures are designed to handle combined floodflows of approximately 630,000 cubic feet per second (cfs). Both of these structures were completed in 1959 and placed in operation in 1963.

The Corps plans to build an auxiliary structure just south of Old River control structure on the west bank of the Mississippi River. The auxiliary structure will have a gross width of 442 feet between faces of abutment training wall and will consist of six gated bays, each having a 62-foot clear opening between piers. The bays will have a weir crest

elevation of minus 5 feet. A highway bridge will be built over the tops of the structure to accommodate Louisiana Highway 15. The auxiliary structure is being proposed as an integral and essential element of the rehabilitation program for the Old River control structure.

The Old River navigation lock, located at approximate river mile 303 above Head of Passes, provides for continued navigation between the Atchafalaya, Ouachita-Black, and Red Rivers, and the Mississippi River through Old River. It has a width of 75 feet, a usable length of 1,190 feet and a sill depth of minus 11.0 feet. Construction of the lock was initiated in 1958 and completed in 1962. The approach channels were completed and the lock was placed in operation in 1963. A roadway on the levee crosses the lock via a lift bridge which was completed in 1965. Average traffic through the lock, 1971-1975, was 4,767,956 tons.

The Morganza control structure is also located on the west bank at about mile 280 above Head of Passes. It is a flood control structure comprising 125 bays (28 feet 3 inches/bay) with a weir elevation of 37.5 feet. Under design conditions, this structure is capable of diverting 600,000 cfs of Mississippi River floodwaters into the lower Atchafalaya Basin via the Morganza Floodway. The structure was completed in 1950.

NON-FEDERAL

The present levee system, surrounding the Louisiana State Penitentiary on the east bank of the Mississippi River, is a state project owned by the Department of Corrections of the Louisiana Department of Health and Human Resources and is not part of the Federal levee system. The levee system was built primarily by inmate labor and does not meet minimum Federal standards. The levees are in poor condition. They were not built to grade or section specifications required for the Federal levee system; hence, they do not provide the degree of protection afforded adjacent lands by the Federal levee system.



CONDITIONS IF NO FEDERAL ACTION IS TAKEN

In response to Federal court orders in 1974, the state was required to reduce its prison population and improve the facilities at Angola. The prison population was reduced between 1974 and 1977. During that time, the state planned extensive improvements to the existing facilities and also began construction of new facilities which allowed an increase in population to 4,500. Hence, the potential loss of human life and damages from flooding is greatly increased. Future flooding greater in magnitude than that experienced in the spring of 1973 would induce social and economic impacts upon the state if the levee system should fail, necessitating removal and relocation of hundreds of inmates at an estimated cost of \$214,000 annually. In addition, damages to existing and proposed facilities would occur. The social aspects of relocating the inmates would not be limited to Angola, but would adversely affect other areas of the state since public sentiment is strongly against the relocation of criminal elements. The most probable future, without Federal action, is that the levees would remain in their existing condition. Existing measures, such as flood-forecasting coupled with flood-fighting and evacuation, would be used to combat floods and that the state would complete its improvement program as stated above and outlined in appendix E.

PROBLEMS, NEEDS, AND OPPORTUNITIES

The deficiencies in the levee grade and cross-section, when combined with the high river stages which occurred in the spring of 1973, posed a serious threat to the penitentiary, requiring an extensive flood fight effort. The integrity of the levee system was challenged, requiring preparations to evacuate the inmate population. Had evacuation become necessary, the problem of providing a secure location to house the prisoners would have been formidable. In addition to the threat of a levee crevasse, the serious seepage and interior drainage problems were great enough in 1973 to delay crop planting and reduce the harvest. Improvements to the facility, necessitated by court orders and other

factors, are increasing the potential damage from flooding in the penal farm. The 1973 flood, estimated to have a return frequency of once in 13 years, required a flood fight expenditure of over \$240,000 in the Angola area.

Maintenance of this locally built levee system is inadequate. The areas where grazing is permitted suffer from deep depressions in the levee, brought about by the continual crossing of cattle during wet weather. At several locations access roads are cut through the levee decreasing its height by about 6 to 8 feet.

Specific requests made at the initial public meeting were as follows: (1) incorporate the Angola levee system into the Federal levee system, (2) make a detailed and comprehensive study of the area for the establishment of adequate levees to protect the maximum land area that can be justified and also provide adequate interior drainage facilities, and (3) include construction of a road to provide access between the ferry landing and the front gate of the penitentiary. Two items were raised at the final public meeting. Two men who reside outside of the northeast corner of the penitentiary grounds expressed concern over the effect a higher levee would have on local drainage in their area. The warden repeated his request for an access road on the levee.

The need to provide an adequate level of flood protection for the Angola area, while minimizing adverse environmental impacts, was the major problem addressed in this study. The adverse social impact associated with the relocation of the inmate population in the event of a levee failure is a problem inherent in meeting the basic objective of the authorizing resolution.

The question raised at the public meeting on local drainage will be addressed in the Advanced Engineering and Design (AE&D) Phase of the study. A ferry landing access road is unrelated to flood control or the authorizing resolution, and the expenditure of funds for such road construction is not a Corps of Engineers water resources planning

function. Therefore, this expressed need could not be addressed in the study. However, the inclusion of such a road in the design at non-Federal expense will be considered in AE&D.

PLANNING CONSTRAINTS

The general planning constraints of this project are derived from the flood protection regulations. These constraints are limited to the extent of both local and Federal interest in providing flood protection for this study area.

Technical constraints required that the selected plans be consistent with local and regional land use plans and that contemplated flood protection improvements be compatible with the MR&T flood control project.

The economic constraints used to optimize the national economic development objective were those prescribed by the Principles and Standards for Planning Water and Related Land Resources, as published in the "Federal Register" on 10 September 1973. All alternative plans were evaluated based on 1980 price levels, and an interest rate of 7 3/8 percent.

The inclusion of flood protection to the Monkey Island and Charity Lake areas is dependent on the improvement of each of these areas being incrementally justified.

The environmental constraints applied in plan formulation provided for consideration of all adverse impacts on the natural environment, and for the consideration of measures to protect, preserve, and enhance the environmental quality of the study area. Plans were evaluated considering national economic development and environmental quality as coequal national objectives.



[REDACTED]

[REDACTED]

[REDACTED]

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The responsiveness of plans was measured against the criteria of acceptability, certainty, completeness, effectiveness, efficiency, geographical scope, national economic development/benefit-cost ratio, environmental consequences, reversibility, and stability; and the acceptance of the selected plan by the general public which was determined through public involvement procedures.

PLANNING OBJECTIVES

The goals of the planning effort were to reduce flood damages at the Louisiana State Penitentiary and associated adverse social impacts in the state, to preserve the remaining bottomland hardwoods in the study area, and to create or enhance existing wildlife habitat.

The study used measures that maximized net benefits from flood damage reduction and measures that minimized adverse environmental impacts. It included investigations on nonstructural, as well as structural measures and combinations thereof, including consideration of Executive Order No. 11988. The effects of any improvements on other Corps of Engineers' projects, particularly the MR&T project, were investigated thoroughly. Studies were made to evaluate the social impact upon the state if this levee system should fail, necessitating the evacuation of hundreds of inmates to other state facilities. Environmental quality and economic considerations were equal planning objectives within the study frame work.

Abstract

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APPENDIX E

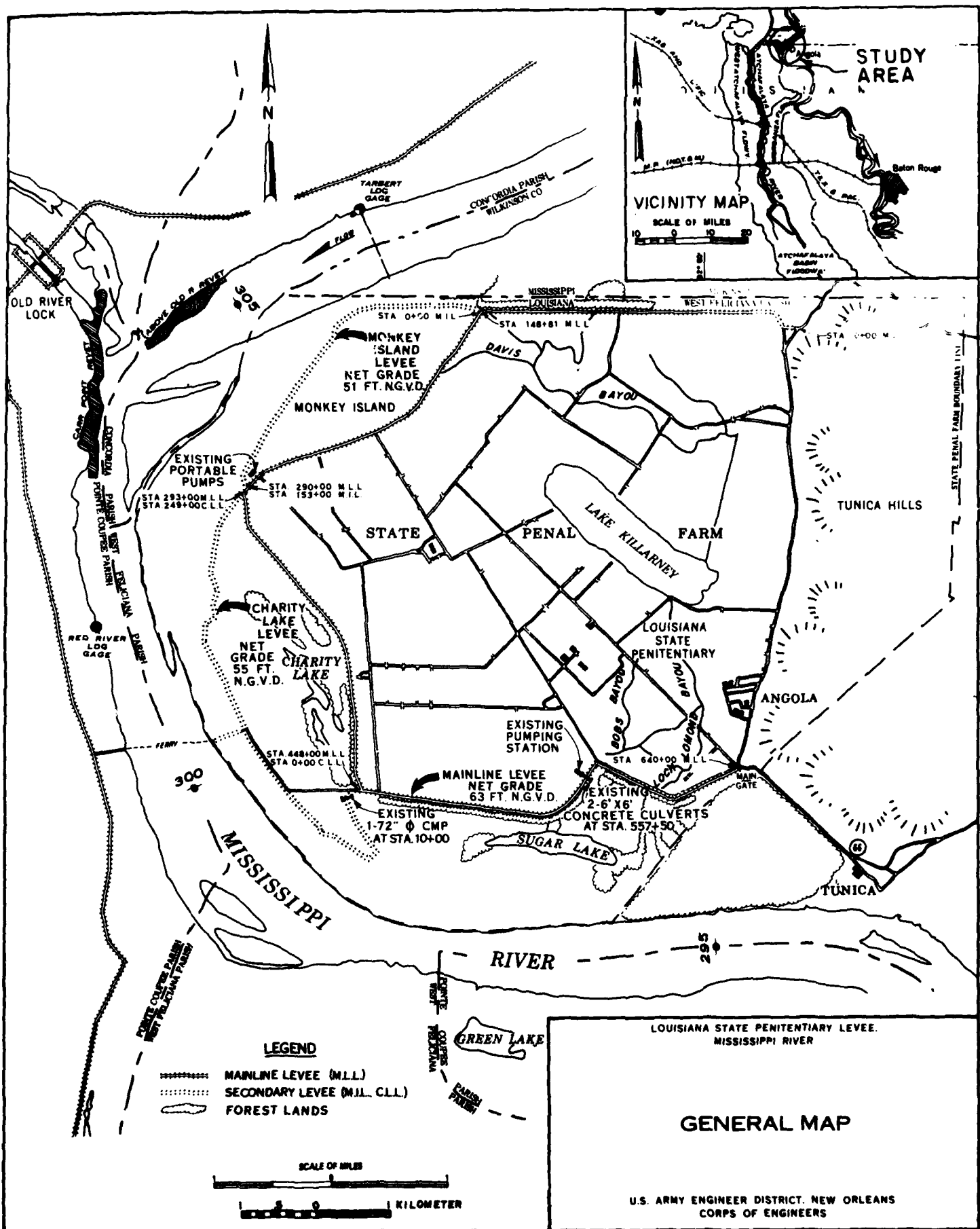
ECONOMICS

GENERAL

The Louisiana State Penitentiary at Angola is located on the left descending bank of the Mississippi River between miles 310 and 294 in the northwest corner of West Feliciana Parish. It incloses an area of 19,428 acres of which 3,187 acres are on high ground located in the Tunica Hills and are not susceptible to flooding. The study area comprises the remaining 16,241 acres which are low-lying, relatively flat Mississippi River alluvial lands, generally situated between 40 and 55 feet National Geodetic Vertical Datum (NGVD).¹ About 9,866 acres of this total are inclosed by a 12.1-mile primary mainline loop levee which abuts the Tunica Hills at both ends and provides protection from Mississippi River headwater flooding for the prison population and their extensive appurtenant supportive facilities. Of the remaining prison lands, 1,416 acres are located in the southwestern portion of the property and are known as the Charity Lake area, and 858 acres are located in the northwestern corner and are known as the Monkey Island area; both these areas are provided some protection by existing small-scale agricultural levees. In addition, 4,101 unprotected acres are located outside of the levee system.

The levees protecting Angola are owned by the Department of Corrections of the Louisiana State Department of Health and Human Resources and were originally constructed with inmate labor; consequently, the present

¹All elevations and stages in this report are in feet National Geodetic Vertical Datum (previously mean sea level) unless otherwise noted.



Angola levee system, which is substandard with regards to Federal specifications, is one of the few mainline systems in the Lower Mississippi Valley which is not under Federal control and supervision. The Louisiana Department of Transportation and Development's Office of Public Works, which is responsible for state flood control interests, does not have the resources to improve the system, and wants the Federal Government to modify the existing system to meet Federal specifications and incorporate it into the Mississippi River and Tributaries (MR&T) project. During the high water period in the spring of 1973, an emergency situation developed which confirmed the substandard levee conditions at Angola. The National Guard was mobilized for the flood-fight and emergency repairs and improvements were required to insure adequate protection. During this emergency, the state was forced to make plans in preparation for evacuation of the entire prison population in case a levee failure occurred. Although the mainline levee did not crevasse, high waters flooded the Monkey Island area, and also would have inundated the Charity Lake area had a massive sandbagging flood-fight effort not been mounted. Altogether, over \$240,000² were expended for flood-fight.

In 1975, high water on the Mississippi again threatened Angola. Although of lesser magnitude than 1973, the floodwaters covered an estimated 80 percent of the Charity Lake and Monkey Island areas. No losses were suffered within the main compound, but a flood-fight effort that cost \$73,000 was required. In April 1979, high water of a 16-year annual exceedence interval again created havoc requiring extensive flood-fighting efforts.

²All prices are as of October 1980 price levels.

PRESENT AND FUTURE DEVELOPMENT

In recent years, prisons throughout the country have come under court orders to modernize their penal facilities in order to provide a better environment for their charges. In 1974, Louisiana was ordered by a Federal circuit court to reduce its prison population at Angola and to greatly improve the penal facilities there. The state agreed to comply with this mandate and has embarked upon a large scale construction and refurbishing program which has added significantly to the value of improvements at Angola. It would be imprudent to locate such a massive complex and its prison population within the immediate flood plain of the Mississippi River without providing the facilities with a high level of protection. In addition to the risks to life, the immense logistical problems involved in trying to evacuate thousands of prisoners to safer areas in the event of future flood threats are great. The degree of flood protection for Angola also involves nonquantifiable, but important social implications. If it becomes necessary to evacuate the prison population, there is the danger of hardened criminals escaping due to the lack of maximum security facilities elsewhere in the state. Also, public sentiment is strongly against the relocating of criminal elements, even for short periods.

VALUE OF IMPROVEMENTS

A tabulation of existing and planned improvements at Angola, all of which are, or will be, located within the area protected by the mainline levee, is shown in table E-1.

PRISON POPULATION

The present inmate population of Angola is 4,200, and is projected to increase to 4,500 as soon as ongoing renovation work is completed, and then to remain stable at that number in the foreseeable future.

TABLE E-1--VALUE OF IMPROVEMENTS

<u>Structures and Contents</u>	<u>Value (1980 price levels)</u>
Existing as of Oct 76:	\$ 46,757,000
Completed from Oct 76 - Jul 80:	
Mess Hall	4,080,000
Electric System	3,360,000
New Dorms	28,800,000
Pumps	660,000
Remodeling and renovation	30,000,000
Support facilities for dorms	5,760,000
Bachelor officers' quarters	5,400,000
Mobile homes	660,000
Training academy	1,800,000
200 new cell blocks	5,400,000
New vocational school	<u>2,760,000</u>
Subtotal	\$88,680,000
Ongoing work:	
Renovation of employee housing	600,000
New employee homes	1,080,000
100 apartment units	<u>4,560,000</u>
Subtotal	\$6,240,000
TOTAL	\$141,677,000

APPENDIX B

FORMULATION, ASSESSMENT, AND EVALUATION OF DETAILED PLANS

The current employee complement at the Angola complex is about 1,700. Of these, approximately 600 live within the compound, while the balance commute from outlying communities. Additionally, there are over 300 employee dependents living within the prison compound.

ALTERNATIVE SOLUTIONS

PRELIMINARY ALTERNATIVES

Seven structural alternative plans were considered in the preliminary analyses for improvement of the levee system at Angola. Six of these plans considered various combinations of protecting the Monkey Island and Charity Lake areas outside of the mainline levee. These six plans were found to be economically unjustified in the preliminary analyses. The remaining structural alternative (plan A) consisted of raising and strengthening the mainline levee only, and is the plan that has been carried forward to the detailed analyses. Table E-2 presents a summary for each alternative plan considered in preliminary planning.

Plan A (national economic development plan) would raise and strengthen the mainline levee to a maximum height of 71.5 feet NGVD by levee enlargement with seepage berms.

Plan B would provide design protection to both the mainline and Monkey Island areas.

Plan C would provide design protection to both the mainline levee and Charity Lake levee areas.

Plan D would provide design protection for the Monkey Island levee, mainline levee, and Charity Lake levee areas.

Plan E would be identical to plan A except that in addition the Monkey Island levee would be raised and strengthened to protect against the 10-year flood.

TABLE E-2--SUMMARY - PRELIMINARY ALTERNATIVES

	Plan A	Plan B	Plan C	Plan D	Plan E	Plan F	Plan G
Total First Cost	\$17,938,000	\$28,052,000	\$25,265,000	\$35,291,000	\$27,004,000	\$22,157,000	\$31,272,000
Present Value of Investments ¹	19,971,000	31,231,000	28,128,000	39,292,000	30,065,000	24,667,000	34,816,000
Interest and Amortization	1,474,000	2,305,000	2,076,000	2,908,000	2,219,000	1,821,000	2,570,000
Operation, Maintenance, and Replacement	14,000	27,000	32,000	47,000	29,000	32,000	50,000
Total Annual Charges	1,488,000	2,332,000	2,108,000	2,947,000	2,248,000	1,853,000	2,620,000
Total Annual Benefits	2,089,000	2,171,000	2,190,000	2,272,000	2,162,000	2,179,000	2,252,000
Net Benefits	601,000	-161,000	82,000	-675,000	-86,000	326,000	-368,000
Benefit-Cost Ratio	1.40	0.93	1.04	0.77	0.96	1.18	0.86
Incremental Benefit-Cost ² Ratio	-	0.10	0.16	0.13	0.10	0.25	0.14

¹Construction is estimated to start in 1987 and to be completed in 2 years. Significant benefits are estimated to start accruing in 1989 (project base year).

²Incremental benefit-cost ratio = $\frac{\text{Benefits Plan "X" - Plan A}}{\text{Costs Plan "X" - Plan A}}$

FEMINIST MOVEMENT

1994

FOUNDATION, AGREEMENT, AND EVALUATION OF DETAILED PLANS

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Plan F would be identical to plan A except that in addition the Charity Lake levee would be raised and strengthened to protect against the 10-year flood.

Plan G would be identical to plan A except that in addition both the Monkey Island levee and Charity Lake levee would be strengthened to protect against the 10-year flood.

DETAILED ALTERNATIVES

In addition to the structural plans considered in preliminary planning, numerous nonstructural options were also evaluated but were found to be impractical. However, all nonstructural options and also the no action plan were again evaluated in stage 3 studies. In addition, a least environmentally damaging plan was formulated, and is the recommended plan. Table E-3 shows the first costs and annual charges.

BENEFITS

METHODOLOGY

It has been assumed that the integrity of the existing mainline levee system at Angola can be maintained with a concerted flood-fight effort until it is overtopped at 61 feet NGVD (excluding 2 feet of freeboard). Once this occurs, the protected area would rapidly fill to that elevation, inundating all improvements within the levee. The design flood frequency of the existing mainline levee (61 feet) has a recurrence interval of once in 30 years which is approximately three times during the 100-year life of the project. It was assumed that subsequent to each crevasse, the levee would be rebuilt to the same configuration as before the crevasse.

All benefits presented herein are based on 1980 price levels and the current interest rate of $7 \frac{3}{8}$ percent assuming a project life of 100 years. Benefits are discussed in the following paragraphs.

TABLE E-3--FIRST COSTS AND ANNUAL CHARGES
(1980 Price Levels)

	<u>Plan A</u>	<u>Plan A1</u> <u>(Recommended Plan)</u>
<u>Summary of Project Costs</u>		
Project First Costs	\$17,938,000	\$18,274,000
Present Value of Construction ¹	19,971,000	20,345,000
Total Investment	19,971,000	20,345,000
<u>Annual Economic Costs</u>		
Interest (7 3/8 percent)	1,473,000	1,500,000
Amortization (100 years)	1,000	1,000
Operation, Maintenance, and Replacement	14,000	14,000
Total Average Annual Charges	1,488,000	1,515,000

¹Construction is estimated to start in 1987 and to be completed in 2 years. Significant benefits are estimated to start accruing in 1989 (project base year).

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TABLE E-4--ESTIMATED STRUCTURE - CONTENTS VALUE

	<u>Administrative- Industrial</u> ($\$$)	<u>Staff Residences</u> ($\$$)	<u>Inmate Residences</u> ($\$$)
Structures	49,514,000	5,400,000	68,482,000
Contents	16,340,000(33%)	2,160,000(40%)	3,424,000(5%)

In order to derive depth-damage relationships for the prison improvements, the structures were categorized into three major groups: administrative and industrial facilities, inmate residences, and staff residences (see plate 2). A cross-section of contents of the administrative and industrial buildings was analyzed for damage susceptibility by a board consisting of New Orleans District experts to derive a percent contents damage for those types of structures. For the inmate residences, a percent contents damage was derived with the help of field trips and from interviews with prison officials, whereas for the staff residences, available residential stage-damage data were used.

In calculating the estimated nonagricultural flood damages to the prison (structural and contents losses), the scenario assumed that a breach in the mainline levee at 61 feet which would quickly fill the area inside the levee to that elevation. This would have a recurrence interval of once in 30 years or approximately three times during the project life.

Nearly all the buildings at Angola are one-story cinderblock and concrete construction and, consequently, should not suffer major structural damage if flooded. The most significant damage would be the need for cleanup, repainting, and replacement and/or repair of the electrical and plumbing facilities. Based on district experience in roughly similar circumstances, it was estimated that, in the aftermath of severe flooding, nearly all the buildings could be restored at a cost of 33 percent of their present replacement values.

APPENDIX B

FORMULATION, ASSESSMENT, AND EVALUATION OF DETAILED PLANS

FORMULATION OF PRELIMINARY PLANS

The formulation of the preliminary plans consisted of identification of appropriate measures responsive to the planning objectives, that were scaled and combined into an array of plans. The alternative plans considered in this report were evaluated on the basis of their socioeconomic, environmental, and engineering factors.

MANAGEMENT MEASURES

In addition to management measures that would provide structural protection to the penal facilities, nonstructural measures that may be employed to provide safety from flooding include the relocation of the facility and evacuation of inmates, employees, and dependents during flood periods.

Measures for addressing the environmental quality study objectives include the avoidance of placing fill material in existing borrow pits and minimizing adverse impacts to the surrounding bottomland hardwoods and to the existing natural lakes and bayous.

PLAN FORMULATION RATIONALE AND ANALYSIS OF PRELIMINARY PLANS

Mississippi River overflow is the major flood threat in the study area. Mississippi River channel improvement is beyond this study's

The road system at Angola consists of 27 miles of bituminous paved roads and 73 miles of gravel farm roads that have a total value of \$5,400,000. It was estimated that with a breach in the levee, the paved and gravel roads would suffer damages for a total repair cost of \$625,000.

There are few contents of value in the large dormitory buildings (metal beds and mattresses) and only the mattresses would be damaged significantly. However, in the kitchen, dining, and cold-storage areas, there are many compressors and cooking facilities which would be heavily damaged. The large industrial-type facilities (tag plant, cannery, Vo-tec school, abattoir, etc.), also contain equipment which is highly susceptible to water damage. Overall, the heaviest damage to be sustained would be to the electrical components: compressors, large ground-mounted transformers and air conditioning units, and the other infrastructural systems (natural gas lines and components, water treatment plants and pumps, and all other motor and motor-driven components).

A summary of damages resulting from a one-time flood occurrence is shown in table E-5. These losses would be prevented by installation of the project.

TABLE E-5--SUMMARY OF DAMAGES
(One Occurrence)

	Adminis- trative & Industrial (%)	Staff Residences (%)	Inmate Residences (%)	Roads (%)	Total (%)
Structural	16,339,000	2,160,000	22,598,000	600,000	41,697,000
Contents	8,006,000	1,944,000	840,000	N/A	10,790,000
Total	24,345,000	4,104,000	23,438,000	600,000	52,487,000
Miscellaneous (5 percent) ¹					2,624,000
					55,111,000

Using a probability analysis, the average annual loss equals approximately \$1,819,000.

¹Includes damages to levees, on-farm drainage facilities, and miscellaneous farm machinery losses.

scope, due to the limited study area and the large cost associated with the different features that would be needed to improve the channel; hence, levees or floodwalls comprise the main feature of any structural plan. The maximum scope of levee work would be to construct a new levee along the Mississippi River's east bank to encompass the entire study area. Plans requiring only modifications to existing levees would be less costly and have fewer adverse environmental impacts associated with their construction than new levee work. Also, lands outside the existing levee systems have marginal economic value. Thus, it was reasoned in the preliminary analyses that no consideration would be given to the protection of adjacent undeveloped lands. Plans comprising construction of floodwalls were also discarded because of the excessive costs involved and because they were inconsistent with the levee designs for the MR&T project.

The construction of a ring levee or levees within the local levee system to increase protection to existing residences and other existing structures was ruled out due to the high cost involved in providing flood protection for the large number of sites that would have to be considered. Construction of these ring levees would also result in isolation of the sites during a major flood for an extended period of time. Isolation of sites is unacceptable to the prison personnel for security reasons. Elevating future development would also be unacceptable as it too would result in isolation.

Locating planned future development in flood-free lands in the Tunica Hills area was considered. The rugged terrain in this area is not suitable however. In addition, this would not address the social impacts of possible evacuation of prisoners still housed in the lowlands during a flood event.

During periods when the Mississippi River is in flood, and the area inclosed by the mainline levee experiences heavy rainfall, drainage can only be accomplished by pumping. This situation occurred in the springs of 1973 and 1979. While structures within the mainline levee do not

DAMAGES PREVENTED TO AGRICULTURE

The National Environmental Policy Act establishes as a Federal policy the preservation of highly productive agricultural lands, known as prime and unique farmlands. The agricultural lands of the state penitentiary contain rich alluvial soils which fall into both categories. The existing prison population, facilities, and agricultural land use are anticipated to remain stable in the future with or without the project; however, the productivity of these prime and unique lands will be enhanced as described in the following sections. The current agricultural land use within the mainline levee consists of 4,850 acres in pasture, 3,500 acres in soybeans, 540 acres in cotton, and 350 acres in corn. A small number of acres are used for growing vegetables which are consumed within the prison. A levee crevasse with complete inundation of these agricultural lands at any time during the spring, with the resulting siltation and erosion problems and higher priority flood recovery efforts, will cause a total loss of net returns to agriculture for at least that year. Based on land use data for without-project conditions contained in table E-6, average annual agricultural damages would be \$28,000. For with project conditions, these losses would be negligible.

During the formulation of preliminary plans, agricultural intensification benefits were calculated on some 1,500 acres of soybeans located in the northern portion of the prison compound that are somewhat lower in elevation than the rest of the compound and often susceptible to interior drainage problems resulting in reduced yields and increased production costs. It was assumed that these drainage problems were primarily the result of a combination of seepage through the mainline levee and inadequate interior pumping capacity. Total intensification benefits to increased soybean production of \$155,000 were then calculated using a five bushel/acre increase in yield potential with project, assuming the seepage berms would alleviate the problem. Subsequently, in the formulation of detailed plans, the problem was determined to be primarily one of inadequate interior drainage at times of intense rainfall runoff from the Tunica Hills. An incremental benefit/cost analysis was then performed to

sustain damages from interior flooding, existing pumping capacity is inadequate to provide drainage relief for some of the more marginal agricultural lands within the compound. It was determined that the costs of providing drainage improvements (pumps and channels) necessary to allow intensified usage of these marginal lands would not be economically justified. Therefore, such improvements were not studied in further detail.

Nonstructural plans considered include relocations of facilities subject to flood damage, flood-proofing, flood-forecasting and evacuation plans, flood-fighting, and land use measures. Relocation of the penal facilities' structures is infeasible because of the costs involved, social aspects, and difficulties in securing an adequate site for this massive complex and its population. At present the state is anticipating spending \$6,240,000, of which \$600,000 is ongoing renovation work, while the remaining \$5,640,000 is for employee homes and apartments which will be built on high ground at the base of the Tunica Hills. Flood-proofing could be accomplished at Angola by raising all structures on pilings to an elevation above that of the design flood. In the event of a breach in the levee, the penal farm would fill to the average river stage elevation of 63 feet NGVD. Ground elevations presently vary from approximately 40 to 55 feet NGVD; consequently, a levee failure causes immediate and massive flooding to a great depth. Flood-proofing would not reduce the threat to lives and, although it would prevent damages to structures, the amount would not be sufficient for justification. Therefore, flood-proofing has been determined to be impractical and expensive. Flood-forecasting for the Mississippi River is adequate; however, the immense financial and logistical problems involved in evacuating thousands of prisoners in the event of a future flood threat are prodigious. The cost of a long term evacuation in the event of a levee crevasse would be approximately \$4,600,000. A short term evacuation, where a crevasse did not occur, would cost approximately \$1,250,000. More detailed information on inmate evacuation and subsistence costs can be found in appendix E. The state has flood-fighting capability as evidenced by their efforts during the 1973 flood. Only measures comprising construction of levees together with the provision of an adequate interior

TABLE E-6--LAND USE DATA WITHIN MAINLINE LEVEE

Land ¹ Use	Acres	Yield/ Acre	Produce	Without Project				Variable Cost/ Unit	Cost Amount	Total Cost	Net Return
				Current Norm Price ²	Gross Value	Fixed Cost/ Acre	Cost Amount				
Cotton	540	775 lb.	418,500	0.599	250,682	107.85	58,239	0.11	46,035	104,274	146,408
Corn	350	50 bu.	17,500	2.48	43,400	56.84	19,894	0.47	8,225	28,119	15,281
Soybeans	3,000	33 bu.	99,000	6.35	628,650	47.28	141,840	0.47	46,530	188,370	440,280
Soybeans	500	28 bu.	14,000	6.35	88,900	47.28	23,640	0.47	6,580	30,220	58,680
Pasture	4,850	2 cwt.	9,700	52.53	509,541	17.15	83,178	23.54	228,338	311,516	198,025
Total	9,240				1,521,173		326,791		335,708	662,499	858,674 (859,000)

¹Source: Officials at Angola

²Source: Agricultural Price Standards - US Water Resources Council - October 1980

drainage system would respond to the objective of reducing potential damages from future floods. Therefore, all feasible nonstructural measures are already part of the without-project condition.

ANALYSIS OF PLANS CONSIDERED

Nonstructural measures described in the previous section do not independently respond to the objective of providing a high degree of flood protection to the existing and planned facilities of the state penitentiary at Angola.

Seven structural plans were considered for improvement of the levee system at Angola. Plan descriptions and comparisons of costs, environmental impacts, and benefits for these plans are provided in subsequent paragraphs.

DESCRIPTION OF PLANS

SAVINGS IN EMERGENCY FLOOD-FIGHT COSTS

The cost expended in 1975 for the flood-fight effort that year was about \$73,000 and was associated with 9-year frequency high water levels. In 1973, flood-fight costs were \$240,000 for a 13-year flood. However, in 1974, the flood-fight costs for a 5-year flood was nominal. Therefore, it is reasonable to expect that flood-fight efforts will begin at Mississippi River levels somewhat below those experienced in 1975, or about 56 feet, which occurs about once every 8 years. In order to determine flood-fights costs saved, a relationship was developed between stage and flood-fight costs, resulting in average annual benefits of \$25,000.

SAVINGS IN LEVEE REPAIR COSTS

Subsequent to each crevasse there will be costs associated with rebuilding the levee to pre-crevasse conditions. The costs have been determined to be \$83,000 per crevasse. Using a probability analysis, the average annual savings in these repair costs is \$3,000.

BENEFITS SUMMARY

A summary of benefits attributable to each alternative plan is displayed in table E-7. Benefit-to-cost ratios are shown in table E-8. An updated benefits summary for the recommended plan using 1981 price levels and the current interest rate (7 5/8 percent) is presented in table E-9.

148+81 and 290+00) and the Monkey Island levee to provide protection from the PDF. All of the improvements including the design criteria of the levee would be the same as plan A. A drainage structure and pumping station (17,000 gpm capacity) would be installed at Monkey Island levee station 153+00.

Plan C - This plan would provide for enlargement of the existing mainline levee (except for the reach between mainline levee stations 293+00 and 448+00) and the Charity Lake levee to provide protection from the PDF. All of the improvements including the design criteria of the levee would be the same as plan A. A drainage structure and pumping station (21,000 gpm capacity) would be installed at Charity Lake levee station 10+00.

Plan D - This plan would provide for enlargement of the existing mainline levee (except for the reaches between mainline levee stations 148+81 and 290+00 and between stations 293+00 and 448+00), Monkey Island levee and Charity Lake levee to provide protection from the PDF. All the elements including levee design and drainage structures discussed in plans A, B, and C would be incorporated in this plan.

Plan E - This plan would provide for enlargement of the existing mainline levee as in plan A while raising the Monkey Island levee to provide approximately 10-year flood protection (maximum height of 61 feet). The specifications for the 10-year levee, except for height, would be the same as those proposed for full protection. New drainage structures for these areas would be identical to those described for plans A and B.

Plan F - This plan would provide for enlargement of the existing mainline levee as in plan A while raising the Charity Lake levee to provide approximately 10-year flood protection (maximum height of 61 feet). The specifications for the 10-year levee, except for height, would be the same as those proposed for full protection. New drainage

TABLE E-7--BENEFITS SUMMARY
(October 1981 price levels; 7 3/8 percent interest rate)

<u>Benefit Category</u>	<u>Plan A</u> (<u>\$</u>)	<u>Plan A1</u> (<u>\$</u>)
Damages prevented to structures	1,819,000	1,819,000
Savings in inmate evacuation costs	214,000	214,000
Damages prevented to agriculture	28,000	28,000
Savings in flood-fight costs	25,000	25,000
Savings in levee repair costs	<u>3,000</u>	<u>3,000</u>
Total Benefits	2,089,000	2,089,000

TABLE E-8--BENEFIT-COST RATIOS

	<u>Plan A</u> (<u>\$</u>)	<u>Plan A1</u> (<u>\$</u>)
Average Annual Benefits	2,089,000	2,089,000
Average Annual Costs	1,488,000	1,515,000
Benefit-Cost Ratios	1.40	1.38

structures for these areas would be identical to those described for plans A and C.

Plan G - This plan would provide for enlargement of the existing mainline levee as in plan A while raising the Monkey Island and Charity Lake levees to provide approximately 10-year flood protection. All the elements of plans A, E, and F would be incorporated in this plan.

COMPARATIVE ASSESSMENT AND EVALUATION OF ALTERNATIVES

All of the plans investigated would provide protection to the penitentiary buildings from the MR&T PDF. Some of the plans also provide varying levels of protection to the outlying agricultural areas. The increases in the design flowline resulting from changes in the overbank flood conditions caused by the alternative levee alignments are considered minor and will not impact the operation of the Old River control structure and/or the Red River backwater area fuseplug levee. Details of these impacts are contained in appendix C.

The rehabilitation of the levee would include a riverside and/or landside enlargement of the existing levee and control measures for seepage problems observed along this levee system during the flood of 1973. The two methods considered for controlling underseepage were landside seepage berms and relief wells. Since the seepage analysis was based on very limited boring information which did not indicate a seepage problem, the recommendations in this report were made based on observed seepage during the 1973 high water. The recommendation to provide for underseepage control was made with the intent that more borings would be needed to further study both stability and seepage in future detailed designs. These points are addressed in appendix C, and additional borings will be taken once a levee plan is approved.

Relief wells were ruled out for controlling the underseepage problems since they would increase the amount of underseepage entering the protected area, thus requiring more water to be handled by the

TABLE E-9--UPDATED BENEFITS SUMMARY
(October 1981 price levels, 7 5/8 percent interest rate)

Benefit Category	Recommended Plan Plan A1 (\$)
Damages prevented to structures	2,001,000
Savings in inmate evacuation costs	235,000
Damages prevented to agriculture	31,000
Savings in flood-fight costs	28,000
Savings in levee repair costs	<u>3,000</u>
Total Average Annual Benefits	2,298,000
Average Annual Costs	1,814,000
Benefit-Cost Ratio	1.27

interior drainage system and pumping stations. They would also require more maintenance and testing which would increase necessary maintenance cost, whereas seepage berms are generally much less costly to construct and maintain than relief wells.

The major environmental impacts which could result from the implementation of the plans include the destruction of bottomland hardwoods and wetlands which serve as important wildlife habitats, and short term deterioration of water quality caused by resuspension of sediments.

Bottomland hardwoods and associated forests were considered to be the most significant environmental resource in the study area. Since they provide important wildlife habitat, negative impacts are highly undesirable. The acres of bottomland hardwoods that would be adversely affected by each plan are shown in Table B-1.

TABLE B-1--ACRES OF BOTTOMLAND HARDWOODS AFFECTED

	<u>Alternative Plans</u>						
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>
Acres affected	79	410	141	439	261	79	261

Low-lying portions of the study area in the Monkey Island and Charity Lake areas are frequently flooded. The periodic inundations serve to rejuvenate these areas by opening up new and productive areas for fish and aquatic animals. Except for plan A, which does not affect these low-lying areas, the other plans investigated would reduce the rejuvenating effect to these areas in various degrees. These other plans would have a detrimental effect on the wetland areas by encouraging a switch to agricultural usage and loss of wildlife habitat.

Construction activities would have some short term impacts on water quality within the study area. The construction of temporary haul roads

APPENDIX F
PUBLIC VIEWS AND RESPONSES

have a frequency of occurrence of once in 30 years, on the average, or approximately three times during the 100-year project life. It was assumed that after each failure the levee would be rebuilt to prior conditions.

A stage of 60 feet NGVD and a forecast of a continued rising crest is considered appropriate for determining the frequency of an emergency evacuation. Such a crest should occur about every 20 years of project life. Significant amounts for flood-fight efforts were expended during the high water periods of 1973 and 1979. In both instances, additional state aid was required to maintain a sandbagging effort. Crests in 1973 and 1979 were 58.2 and 59.2, respectively. In 1974 and 1975, flood crests were lower. In 1974, flood-fighting costs were nominal, whereas in 1975, a flood crest somewhat higher than in 1974 required flood-fighting, although not to the extent of 1973 or 1979. Therefore, it was assumed that no future significant flood-fighting would take place at stages less than those where flood-fighting began in the flooding of 1975, or at an 8-year frequency.

Flood damages which would be prevented by all action plans or savings in costs which result from the increased protection from all action plans include: damages prevented to structures, savings in emergency evacuation and subsistence costs, and savings in emergency flood-fight costs.

Although borrow areas created during construction would afford some additional recreational potential for fishing, recreation benefits cannot be calculated as public access is limited. Future use of the borrow areas by facility employees and their families is expected to be minimal.

Table B-2 is a summary of the first costs, annual charges, benefits and benefit-cost ratios for the alternative plans. Detailed estimates of first costs are shown in tables C-4 and C-5. In addition to the overall benefit-cost ratio, an incremental benefit-cost ratio was computed for plans B through G with plan A being the base condition. The incremental

TABLE B-2--FIRST COST AND ANNUAL CHARGES--PRELIMINARY LEVEE PLANS

	Plan A	Plan B	Plan C	Plan D	Plan E	Plan F	Plan G
FIRST COST							
Lands	\$1,159,000	\$1,056,000	\$1,097,000	\$990,000	\$1,350,000	\$1,456,000	\$1,628,000
Construction	11,985,000	19,283,000	17,262,000	24,500,000	18,335,000	14,786,000	21,174,000
Contingencies	2,996,000	4,821,000	4,315,000	6,125,000	4,584,000	3,697,000	5,294,000
Engineering and Design	899,000	1,446,000	1,295,000	1,838,000	1,375,000	1,109,000	1,588,000
Supervision and Administration	899,000	1,446,000	1,295,000	1,838,000	1,375,000	1,109,000	1,588,000
Total First Costs	17,938,000	28,052,000	25,265,000	35,291,000	27,004,000	22,157,000	31,272,000
Present Value of Investment ¹	19,971,000	31,231,000	28,128,000	39,292,000	30,065,000	24,667,000	34,816,000
ANNUAL CHARGES							
Interest and Amortization	1,474,000	2,305,000	2,076,000	2,900,000	2,219,000	1,821,000	2,570,000
Operation, Maintenance and Replacement	14,000	27,000	32,000	47,000	29,000	32,000	50,000
Total Annual Charges	1,488,000	2,332,000	2,108,000	2,947,000	2,248,000	1,853,000	2,620,000
Total Annual Benefits	2,089,000	2,171,000	2,190,000	2,272,000	2,162,000	2,179,000	2,252,000
Net Benefits	601,000	-161,000	82,000	-675,000	-86,000	326,000	-368,000
Benefit-Cost Ratio	1.4	0.93	1.04	0.77	0.96	1.18	0.86
Incremental Benefit-Cost Ratio ²	--	0.10	0.16	0.13	0.10	0.25	0.14

¹Construction is estimated to start in 1987 and to be completed in 2 years.

Significant benefits are estimated to start accruing in 1989 (project base year).

²Incremental benefit-cost ratio = $\frac{\text{Benefits Plan "X" - Plan A}}{\text{Costs Plan "X" - Plan A}}$

ratio shows the relative merits of the added benefits versus the additional cost incurred in upgrading the protection of the outlying areas.

CONCLUSIONS (SCREENING)

The incremental benefit-to-cost ratios for plans B through G were all less than 1 when compared to plan A. It was, therefore, determined that it was not economically justified to provide increased flood protection to the outlying areas; i.e., Monkey Island and Charity Lake areas. These plans would result in more adverse environmental impacts than plan A.

Plan A was determined to be economically justified and satisfied the planning objective for reducing flood damages and associated adverse social impacts. Of all the structural plans it would cause the least environmental damage. Therefore, it was decided to select plan A for detailed study.

In the detailed study process, plan A was reanalyzed to determine if its potential adverse environmental impacts could be further minimized by such measures as modifying construction methods. This least environmentally damaging plan was designated as plan A1 in the detailed study process.

As previously determined, feasible nonstructural measures are part of the without-project condition; the nonstructural plan is the same as the no action plan.

ASSESSMENT AND EVALUATION OF DETAILED PLANS

Information presented in the following paragraphs describes each of the plans considered in detail. In addition to the description, the

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significant beneficial and adverse impacts and an evaluation and trade-off analysis are discussed. Responsibilities for implementation are presented for each of the detailed plans. Also presented is the cost apportionment based on traditional cost-sharing policies.

PLAN A

PLAN DESCRIPTION

This plan (shown on plate B-2) consists of raising and strengthening the mainline levee to a maximum height of 71.5 feet NGVD by levee enlargement either riverside or landside with seepage berms where seepage has been observed. The levee would have a 10-foot crown with side slopes of 1 vertical on 5.5 horizontal on the landside and 1 vertical on 4 horizontal on the riverside. Existing and proposed levee cross-sections are shown on plates C-3 and C-4. This would provide protection from the standard PDF with 4 feet of freeboard.

Included in this plan is the replacement of the existing 6- by 6-foot concrete culverts with two new 6- by 6-foot concrete culverts with sliding vertical sluice gates. The new culverts will be 290 feet long with stop logs at either end for secondary closure. No change would be made to the three existing electrical pumps which have a total pumping capacity of 120,000 gpm. The water is pumped over the levee through two 36-inch diameter cast iron pipes. These pipes would require modifications so that they would pass over the top of the new levee.

Levee enlargement would be done to the landside of the existing levee where existing borrow pits are up against the levee. The fill material would be taken from new borrow pits, on the riverside of the existing mainline levee with average dimensions of 10 feet deep by 285 feet wide by about 10 miles long running parallel to the levee. The

distance between the toe of the improved levee and the borrow pits would be approximately 450 feet.

IMPACT ASSESSMENT

NATIONAL ECONOMIC DEVELOPMENT IMPACTS

The first cost of plan A is estimated at \$17,938,000 and the total annual cost estimated at \$1,488,000, including \$1,474,000 for interest and amortization of the initial investment and \$14,000 for operation and maintenance.

The benefits attributable to plan A are estimated to average \$2,089,000 annually. These benefits are attributable to savings in the reduction of flood damages due to the destruction of buildings and crops; the deterrent of the evacuation of prisoners and compound employees and their dependents, i.e., savings in evacuation costs; and savings in emergency flood-fighting costs.

The average annual net benefits are estimated at \$601,000, and the ratio of average annual benefits to average annual costs is 1.40.

ENVIRONMENTAL IMPACTS

Water Bodies and Associated Wetlands. This plan would result in direct impacts to approximately 10 acres of open water and wetlands. These impacts would result from excavation of borrow material from these areas within the confines of the borrow area alignment as indicated on plate 2 and the deposition of fill material for haul roads into the existing borrow pits. Constructing activities would cause immediate increases in turbidity and resultant decreases in light penetration in the affected borrow pits' waters. The excavation action would result in the removal of the vegetative canopy which would eventually allow greater light intensity and subsequently higher water temperatures and greater photosynthetic activity. A Section 404(b) (Clean Water Act) evaluation

would not be required for this plan. Section 404(f) provides exemptions for temporary haul roads. Construction the haul roads with culverts to allow natural water movement to continue and removing the roads after completion of construction alleviates the need for a 404(b) study. The impact of this plan upon the water quality of the Mississippi River would be insignificant. Impacts upon wetland resources would be negative, due to the reduction of the area of normal water fluctuations, of general habitat, food chain productivity, and nesting, spawning, rearing, and resting sites for terrestrial and aquatic species.

Bottomland Hardwoods and Associated Forests. This plan would result in the destruction of approximately 79 acres of forests. These losses would occur due to clearing for the borrow excavation area and for haul roads between the excavation area and the levee. The destruction of these forested areas would reduce the buffer effect presently provided against river wave action to the levee and the soil-holding function provided by growing tree roots. After construction, natural forest succession would eventually result in the establishment of bottomland hardwood forests on those areas cleared for haul roads. Significant sediment deposition has not been occurring recently in proposed borrow pit areas; therefore, a mixture of riverfront hardwood species, depending upon the seed source, would become established on those cleared areas.

Fishery Resources. This plan calls for the excavation of approximately 345 acres of borrow pit resulting in the conversion of that entire area to aquatic habitat available for fisheries utilization. Habitat quality would be very low in the borrow pits initially as diversity would be lacking completely until submergent vegetation becomes established. Fish populations would be established in most borrow pits by inundation from high spring river flows, but population development would be dependent upon population development of lower members of the food chain. Fish population development in the Charity Lake borrow pit area would not progress at the same rate as other areas due to infrequent river flooding. Fish population establishment in this area would be dependent upon a hydraulic connection to Charity Lake. Suitable spawning areas

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would be provided on borrow pit side slopes with the design excavation of 1 vertical on 3 horizontal side slopes.

Wildlife Resources. This plan would result in significantly greater adverse impacts to terrestrial wildlife resources than the implementation of the other plan. Approximately 79 acres of woodlands would be destroyed with this plan. Those wildlife individuals whose territory includes woodlands to be removed for excavation or rights-of-way purposes will either be displaced or destroyed by this action. Creation of approximately 345 acres of borrow pit would provide habitat for terrestrial wildlife highly dependent upon aquatic habitat. The amount of use, however, would be dependent upon the development of food-producing vegetation along the shorelines. Water-dependent furbearers would receive increased amounts of habitat due to the creation of borrow pits. Habitat quality would initially be very poor, but would improve with the establishment of shoreline vegetation. The conversion of approximately 266 acres of open land to borrow area would result in the permanent removal of that amount of open land habitat and a corresponding loss to all species inhabiting that area.

Threatened and Endangered Species. This plan would, overall, provide beneficial impacts to endangered species within the study area. The creation of open, deepwater areas by borrow pit excavation would provide suitable habitat for courtship and breeding required for the American alligator. Habitat value would increase with time due to the establishment of cover provided by aquatic vegetation, due to increased productivity as conditions become more stabilized, and due to fisheries rejuvenation by frequent river overflows into some borrow areas.

Audubon Society Blue List. Plan A would not significantly affect any species of bird on the 1981 blue list. However, the primary habitat for the majority of birds on the blue list found in the study area is forest, of which some would be destroyed.



United States
Department of
Agriculture

Soil
Conservation
Service

3737 Government Street
Alexandria, LA 71301

October 22, 1981

Colonel Robert C. Lee
Commander and District Engineer
Corps of Engineers
P. O. Box 60267
New Orleans, LA 70160

Dear Colonel Lee:

Re: LHMFD-RE

We have reviewed the draft Main Report, Environmental Impact Statement, and Technical Appendices of August, 1981, for the Louisiana State Penitentiary Levee, Mississippi River. These reports are well written and present clear descriptions of the alternatives considered. Proposed improvements on the Angola levee will provide additional protection to approximately 9,240 acres of prime and unique farmland. Approximately 300 acres of agricultural lands will be converted to borrow pits.

We appreciate the opportunity to review these draft documents and have no additional comments.

Sincerely,

Alton Mangum
State Conservationist

cc: Norman Berg, Chief, SCS, Washington, D.C.
Thomas Rockenbaugh, Assistant Chief, SW, SCS, Phoenix, Arizona
Billy M. Johnson, Director, STSC, SCS, Fort Worth, TX
Director, Environmental Services, SCS, Washington, D.C.

No response required.



The Soil Conservation Service
is an agency of the
Department of Agriculture

SCS-AS-1
10-79



GENERAL COUNCIL OF THE
UNITED STATES DEPARTMENT OF COMMERCE
Washington, D.C. 20530

2

NOV 10 1981

Colonel Robert C. Lee
New Orleans District, Corps of Engineers
Department of the Army
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Lee:

This is in reference to your draft environmental impact statement entitled, "Louisiana State Penitentiary Levee, Mississippi River." The enclosed comment from the National Oceanic and Atmospheric Administration is forwarded for your consideration.

No response required.

Thank you for giving us an opportunity to provide this comment, which we hope will be of assistance to you. We would appreciate receiving four copies of the final environmental impact statement.

Sincerely,

Robert T. Miki
Robert T. Miki
Director of Regulatory Policy

Enclosure Memo from: Robert B. Rollins
National Ocean Survey
NOAA

Recreational Resources. The borrow areas created during project construction would afford some additional recreational potential for fishing. When the eventual overbank flooding by the Mississippi River occurs, a natural restocking process will supply and rejuvenate these borrow areas with native game fish and rough fish species. The future occasional use of the borrow areas by the Louisiana State Penitentiary employees and their dependents is forecasted to be minimal.

Agricultural Land Resources. This plan would result in beneficial impacts through the prevention of a levee crevasse to the mainline levee and the resulting inundation of approximately 9,240 acres of prime and unique farmlands. This action would further insure the preservation and continual utilization of these highly productive agricultural lands. A comparatively insignificant number of cropland acres would receive adverse impacts in areas where landside levee enlargement and seepage berms are required. These changes of farmland to levee and seepage berms still have a potential of pastureland usage causing the impacts to be even smaller. Riverside borrow excavation would also convert 266 acres of agricultural lands, which are used primarily as pasturelands and are not classified as prime farmland, to borrow pits. This would constitute a total loss of these lands to agricultural production.

Cultural Resources. This plan would not affect any cultural resources presently listed on the National Register of Historic Places. Because of its proximity to the confluence of the Mississippi and Red Rivers, the study area has been an advantageous location for trade, settlement or encampment through time. During the Civil War, Tunica Bend and Raccourci Island were sites of several small naval encounters. Late 19th century Mississippi River Commission maps identify the present penitentiary grounds as Angola Plantation. It is expected that additional sites exist along the base of the hill line, along Davis, Bobs, and Loch Lomond Bayous, and on natural levees adjacent to relict Mississippi River channels such as Charity Lake, Sugar Lake, and Lake Killarney. An intensive cultural resources survey of the proposed impact zone will be conducted during advanced feasibility studies (Phase I AE&D). The impact



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, MD 20852

September 24, 1981

3

TO: PP/EC - Joyce M. Mood
FROM: OA/CS - Robert B. Rollins
SUBJECT: DEIS 8109.14 - Louisiana State Penitentiary Levee, Mississippi River

The subject statement has been reviewed within the areas of the National Ocean Survey's (NOS) responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and project:

3.1 Geodetic control survey monuments may be located in the proposed project area. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days' notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for NOS monuments. For further information about these monuments, please contact Mr. John Spencer, Director, National Geodetic Information Center (OA/C18) or Mr. Charles Novak, Chief, Network Maintenance Branch (OA/C172), at 6001 Executive Boulevard, Rockville, Maryland 20852.

Response 3.1—The locations of geodetic control survey monuments will be confirmed in the design phase of the study. National Ocean Survey will be notified at that time and arrangements will be made for relocation.



10TH ANNIVERSARY 1970-1980
National Oceanic and Atmospheric Administration
A young agency with a historic
tradition of service to the Nation

3

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Center for Disease Control
Atlanta, Georgia 30333
(404) 262-6649

November 2, 1981

Colonel Robert C. Lee
Commander and District Engineer
Department of the Army
New Orleans District, Corps
of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Lee:

We have reviewed the Draft Environmental Impact Statement (EIS), Main Report, and Appendices for Construction of the proposed flood control project, Louisiana State Penitentiary Levee, Mississippi River. We are responding on behalf of the Public Health Service.

4.1 No mention is made of either existing or potential mosquito or other vector populations that will be impacted by the project. The Final EIS should describe the extent of these vector populations and the beneficial or adverse project effects. There should also be descriptions of who will provide mosquito control activities, the anticipated control measures to be followed, and the proposed application rates and methods of application for any insecticides that may be used.

4.2 If it is anticipated that there will be any vegetation control measures employed during or after project completion, the Final EIS should describe the control measures to be followed, the methods of chemical application, the types of herbicides to be used, and other related aspects of the control program.

Thank you for the opportunity of reviewing the Draft EIS. We would appreciate receiving a copy of the Final EIS when it is issued.

Sincerely yours,

Frank S. Lianila
Frank S. Lianila, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Center for Environmental Health

Response 4.1--Information on vector populations and project effects was added on pages EIS-18 and EIS-26. Vector control will be addressed in the advanced engineering and design report indicating the responsibility and methods by which vector problems will be minimized during construction activities.

Response 4.2--It is not anticipated that there will be any chemical vegetation control measures employed during or after project completion.

corridor appears to follow a relict 19th century river course. If sites are located within this corridor, it is expected that the majority will be historic and may include buried shipwrecks.

SOCIAL WELL-BEING IMPACTS

Plan A would have significant effects on social well-being in the study area as well as the State of Louisiana as a whole. The evacuation of the prisoners would cause undue hardship to both residents surrounding the prison as well as to residents of areas to which the prisoners would be transferred. The implementation of this plan would serve to alleviate the risk of evacuating the prisoners, thereby producing a favorable affect on the social well-being of the area as a whole.

REGIONAL DEVELOPMENT IMPACTS

The induced development effected by plan A would be the utilization of the underemployed labor potential that is located in the study area. Project construction and maintenance operations would provide minor increases in real income and income distribution.

EVALUATION AND TRADE-OFF ANALYSIS

Plan A fulfills the primary planning objectives of reducing flood damages and associated adverse social impacts for the penal farm. The estimated first cost is \$17,938,000. The benefit-to-cost ratio is 1.40 and the excess average annual benefits over cost are \$601,000, the higher of the two plans.

Plan A also complies with some of the environmental quality objectives in that it creates aquatic habitat.

From an overall standpoint, plan A is the most economical plan for providing increased flood protection for the study area. The plan is implementable and acceptable.



REGION VI

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FORT WORTH REGIONAL OFFICE
201 WEST LANCASTER AVENUE
P.O. BOX 2808
FORT WORTH, TEXAS 76112

5

IN REPLY REFER TO:

October 29, 1981

Colonel Robert C. Lee
District Engineer
New Orleans District
Corps of Engineers, U.S. Army
P.O. Box 60267
New Orleans, Louisiana 70160

No response required.

Dear Colonel Sands:

The Draft Environmental Impact Statement Main Report and Appendices for Louisiana State Penitentiary Levee, Mississippi River has been reviewed in the Department of Housing and Urban Development's New Orleans Area Office and Fort Worth Regional Office, and it has been determined that the concerns of the Department have been disclosed adequately without adverse impact or involvement.

Sincerely,

W. J. Hancock
Walter J. Hancock
Environmental Clearance Officer

5

AREA OFFICES
DALLAS, TEXAS; LITTLE ROCK, ARKANSAS; NEW ORLEANS, LOUISIANA; OKLAHOMA CITY, OKLAHOMA; SAN ANTONIO, TEXAS



United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Project Review
Post Office Box 3088
ALBUQUERQUE, NEW MEXICO 87103

6

ER-81/1869

NO. 06 1981

District Engineer
New Orleans District,
Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Sir:

We have reviewed the draft environmental statement, Main Report, and Appendices for Louisiana State Penitentiary Levee, Mississippi River, West Feliciana Parish, Louisiana, and have the following comments.

6.1 The proposed intensive cultural resources survey referred to on page 28 should include the disciplines of archeology, architecture, and history with competent professionals in each field. Also, the Corps of Engineers must request determinations of eligibility for the National Register on each of the sites and structures identified in the survey. We would welcome the opportunity to comment on the report when it is completed.

Thank you for the opportunity to comment on these documents.

Sincerely,

Raymond P. Churan

Raymond P. Churan
Regional Environmental Officer

Response 6.1—The Corps will conduct an intensive survey utilizing professionals of all appropriate disciplines. The report of these investigations will be coordinated with the Louisiana State Historic Preservation Officer (SHPO), whose opinion regarding site significance will be requested. In accordance with 36CFR800.4 (Advisory Council of Historic Preservation: Protection of Historic and Cultural Properties) formal requests for determinations of eligibility to the National Register of Historic Places will be made only for those sites which either the Corps or the SHPO find meet National Register criteria (36CFR800.4, dated 16 Nov 81).

IMPLEMENTATION RESPONSIBILITIES

COST ALLOCATIONS

All costs for the construction and maintenance of plan A would be allocated to flood control.

COST APPORTIONMENT

Under traditional cost-sharing policies of the 1936 Flood Control Act the total first cost of \$17,938,000 would be apportioned \$16,779,000 to the Federal Government and \$1,159,000 to non-Federal interests. The non-Federal portion of the first cost would be the cost of all lands, easements, rights-of-way, and relocations. All of the estimated annual operation and maintenance costs of \$14,000 would be borne by the non-Federal interests.

PLAN A1

PLAN DESCRIPTION

This plan (shown on plate B-3) consists of raising and strengthening the mainline levee to the same specifications as in plan A. The levee would have a maximum height of 71.5 feet NGVD and a 10-foot crown with side slopes of 1 vertical on 5.5 horizontal on the landside and 1 vertical on 4 horizontal on the riverside. This would provide protection from the standard PDF with 4 feet of freeboard.

The existing pair of 6- by 6-foot concrete culverts would be replaced with two new 6- by 6-foot concrete culverts with vertical sluice gates. No change will be made to the three existing pumps which have a total pumping capacity of 120,000 gpm. The water is pumped over the levee through two 36-inch diameter cast iron pipes. These pipes will require modifications in order to pass over the top of the new levee.



STANDARD

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
P. O. BUILDING
WASHINGTON, D. C. 20590
September 16, 1981

7

REPLY TO

Louisiana State Perpetuity Levee,
Mississippi River Draft Report, H16,
and Technical Appendices
LH870-82

Colonel Robert C. Lee, CE
Commander and District Engineer
New Orleans District
Corps of Engineers
P. O. Box 60247
New Orleans, Louisiana 70166

No response required.

Dear Colonel Lee:

We have no comments on the subject document. Thank you for the
opportunity to comment.

Sincerely yours,

J. H. McDonald
J. H. McDonald
Division Administrator

Adverse environmental impacts would be minimized in this plan. Levee enlargement would be done to the landside of the existing levee where existing borrow pits abut the levee so as not to place any fill material in the borrow pits. The fill material would be taken from new borrow pits (10 feet by 285 feet by 10 miles long) parallel to the riverside of the levee. The distance between the toe of the levee and the borrow pits would be approximately 450 feet. Extra care would be taken to avoid bottomland hardwoods when digging the new borrow pits. All wetlands contiguous to Charity Lake and Sugar Lake would also be avoided when digging the borrow pits. The construction of the haul roads from the new borrow pits would be done in such a way that waters of wetlands and existing borrow pits hydrologically connected to Charity or Sugar Lakes would not be affected by the placement of fill material.

IMPACT ASSESSMENT

NATIONAL ECONOMIC DEVELOPMENT IMPACTS

The first cost of plan A1 is estimated at \$18,274,000 and the total annual cost estimated at \$1,516,000, including \$1,501,000 for interest and amortization of the initial investment and \$14,000 for operation and maintenance.

The benefits attributable to plan A1 are estimated to average \$2,089,000, annually. These benefits are attributable to savings in the reduction of flood damages due to destruction of buildings and livestock; the deterrent of evacuation of prisoners and employees and their dependents, i.e., savings in evacuation costs; and savings in emergency flood-fighting costs.

The average annual net benefits are estimated at \$574,000, and the ratio of average annual benefits to average annual costs is 1.38.

ENVIRONMENTAL IMPACT OF THE ACTION

LO - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER - Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to re-assess these aspects.

EU - Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make a determination.

ENVIRONMENTAL IMPACTS

Water Bodies and Associated Wetlands. This plan would result in direct impacts to approximately 1 acre of open water and wetland. These impacts would result from the introduction of fill material into the existing borrow pits to serve as haul roads across these areas. A Section 404(b) evaluation would not be required for this plan. As with plan A, it is eligible for exemption under Section 404(f). The impacts of this plan upon the water quality of the Mississippi River would be insignificant. The destruction of wetland areas as required by haul road construction would result in the same kinds of impacts to terrestrial and aquatic species as listed for the other plan; however, the extent of the impacts would be greatly reduced.

Bottomland Hardwoods and Associated Forests. This plan would result in comparatively minimal impacts to forested areas. As indicated in the plan description, destruction to forested areas would be avoided, with limitations, with this plan. However, required haul roads through wooded areas would result in the destruction of approximately 5 acres of forest. The kinds of impacts upon forests would be the same with this plan as with plan A; however, the quantity of impacts would be greatly reduced.

Fishery Resources. This plan would require the excavation of the same amount of borrow material and would result in the creation of the same amount of aquatic habitat as would plan A. Impacts to fishery resources resulting from the implementation of the plan would be the same as with plan A.

Wildlife Resources. This plan would result in comparatively less severe impacts to terrestrial wildlife resources than would implementation of plan A. Approximately 5 acres of woodlands would be destroyed with this plan. As mentioned previously, destruction or displacement of wildlife species occupying that habitat would occur. Destruction is more probable since carrying capacities of adjacent woodlands would probably remain the



DAVID C. TREEN
Governor

STATE OF LOUISIANA
DEPARTMENT OF CULTURE, RECREATION AND TOURISM
OFFICE OF PROGRAM DEVELOPMENT

ROBERT B. DUBLEUX
Assistant Secretary

MRS. LAWRENCE H. FOX
Secretary

October 13, 1981

9

Colonel Robert C. Lee
Commander and District Engineer
Department of the Army
New Orleans District, Corps of Engineers
P. O. Box 60267
New Orleans, LA 70160
LAMPD-22

Re: Draft Environmental Impact Statement
Louisiana State Penitentiary Levee
West Feliciana Parish

No response required.

Dear Colonel Lee:

My staff has reviewed the above-referenced document at your request, and we are pleased to note the commitment to undertake an intensive cultural resources survey of the proposed impact zone during advanced feasibility studies. We will be happy to review this report when it becomes available.

If we may be of further assistance, do not hesitate to contact my staff in the Division of Archaeology and Historic Preservation.

Sincerely,

Robert B. Dubleux

Robert B. Dubleux
State Historic Preservation Officer

RBD:PMR:tb

10

DIVISION OF ARCHAEOLOGY AND HISTORIC PRESERVATION
P. O. Box 44247 Baton Rouge, La. 70804 224 342-6882

same. Borrow pit excavation would also result in the creation of 345 acres of aquatic habitat with this plan providing the same benefits to wildlife as described previously. However, the conversion of 345 acres of open land to aquatic habitat would result in a corresponding loss to wildlife occupying open land habitat.

Threatened and Endangered Species. The implementation of this plan would, overall, provide beneficial impacts to endangered species within the study area. Impacts resulting from this plan would be practically identical to those resulting from plan A. The same amount of American alligator habitat would be created with the implementation of plan A1 as with the implementation of plan A. Habitat values initially would be low, but would increase with time as described for plan A.



Jesse J. Guidry
Secretary

DEPARTMENT OF WILDLIFE AND FISHERIES
400 PONTAL STREET
NEW ORLEANS 70130

DAVID C. GREEN
Secretary

October 12, 1981

Colonel Robert C. Lee
New Orleans District
Corps of Engineers
P.O. Box 60267
New Orleans, La. 70160

RE: LMSFD-RE La. State Penitentiary
Levee, Mississippi River

No response required.

Dear Sir:

We have reviewed the above referenced draft document and concur in the assessment and recommendation to implement Alternative A-1.

We appreciate the opportunity afforded us to work with your staff on this project and to review the draft document.

Sincerely,

Jesse J. Guidry
Jesse J. Guidry
Secretary

JJC:MMW:cig

SOCIAL WELL-BEING IMPACTS

Plan A1 would have significant effects on social well-being in the study area as well as the State of Louisiana as a whole. The evacuation of the prisoners would cause undue hardship to residents surrounding the prison as well as to residents of areas to which the prisoners would be transferred. The implementation of this plan would serve to alleviate the risk of evacuating the prisoners, thereby producing a favorable affect on the social well-being of the area as a whole.

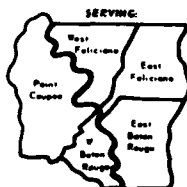
REGIONAL DEVELOPMENT IMPACTS

The induced development effected by plan A1 would be the utilization of the underemployed labor potential that is located in the study area. Project construction and maintenance operations would provide minor increases in real income and income distribution.

EVALUATION AND TRADE-OFF ANALYSIS

Plan A1 fulfills the primary planning objectives of reducing flood damages and associated adverse social impacts for the penal farm. The estimated first cost is \$18,274,000, which is somewhat higher than plan A. The benefit-to-cost ratio is 1.38 and the excess average annual benefits over costs are \$574,000 which is only slightly less than plan A.

Of all plans considered, plan A1 most closely meets the primary planning and environmental quality objectives in that it minimizes adverse environmental impacts as much as possible. It is also implementable and acceptable to all who are concerned.



Capital-Area Groundwater Conservation Commission

F. O. Box 64526
Baton Rouge, Louisiana 70896
Telephone (504) 924-7490

September 25, 1981

12

Colonel Robert C. Lee, District Engineer
Department of the Army, Corps. of Engineers
New Orleans District
Postoffice Box 60267
New Orleans, Louisiana 70160

RE: EIS, Louisiana State Penitentiary
Levee—Draft, August 1981
LAMPD-EE

No response required.

Dear Colonel Lee:

The referenced EIS has been reviewed and the proposed flood control project should have no adverse effect on the area's ground water resources. Although the borrow pits may cut into the shallow part of the Mississippi alluvial aquifer, the interchange of water into and from the river should have no adverse effect on water quality from existing wells in the alluvial aquifer. Records indicate that all wells in this aquifer are on the west side of the river, thus the long travel time will reduce the possibility of water quality changes. During low flow, it is possible that the discharge toward and into the river may be increased. This will cause some additional lowering of water levels, but only in the immediate vicinity of the excavation.

Thus, we have no objections to the contents of the EIS and to the planned activities.

Very truly yours,

A. M. Turcan, Jr.
A. M. Turcan, Jr.
Director

ANT/obo

IMPLEMENTATION RESPONSIBILITIES

COST ALLOCATIONS

All costs for the construction and maintenance of plan A1 would be allocated to flood control.

COST APPORTIONMENT

Under traditional cost-sharing policies the total first cost of \$18,274,000 would be apportioned \$17,115,000 to the Federal Government and \$1,159,000 to non-Federal interests. The non-Federal portion of the first cost would be the cost of all lands, easements, rights-of-way, and relocations. All of the estimated operation and maintenance costs of \$14,000 would be borne by the non-Federal interests.

COMPARISON OF DETAILED PLANS

Comparative information on the detailed plans is presented in subsequent paragraphs along with the rationale for designating one of the plans as the national economic development plan, one as the least environmentally damaging plan and one as the recommended plan.

The two plans considered in detail were structural plans. All feasible nonstructural measures are already part of the without-project condition; i.e., the nonstructural plan is the same as the no action plan. This plan does not respond to the planning objectives.

Both of the plans considered in detail would comply with the primary planning objectives of reducing flood damages and associated adverse social impacts. Both plans are economically justified, but plan A is less costly and provides higher average annual excess benefits over costs than plan A1. Plan A1 includes provisions to avoid woodland and wetland areas when digging the borrow pits.



DANIEL A. POOLE
President
L. E. JAHN
Vice-President
L. L. WILLIAMSON
Secretary
JACK S. PARKER
Board Chairman

Wildlife Management Institute

709 Waco Building, 1020 Vermont Ave., N.W., Washington, D.C. 20005 • 202 / 347-1774

PLEASE REPLY TO:
Murray T. Walton
Southeastern Representative
Box Route 5A, Box 810
Dripping Springs, Texas 78620
512-853-3473

October 10, 1981

Colonel Robert C. Lee
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Lee:

The Wildlife Management Institute has reviewed the Draft Main Report and Environmental Impact Statement for the Louisiana State Penitentiary Levee, Mississippi River. We are most favorably impressed with the attention and consideration given fish and wildlife resources in this document, particularly in relationship to the project purpose, i.e. provision of flood protection to a highly developed area with rather critical need for such protection.

The Institute notes that the tentatively selected plan, A-1, is also designated the least environmentally damaging of the action alternatives. Page EIS-2 states "...the minor increases in cost associated with plan A-1 would be small when compared to the adverse environmental impacts that would accompany Plan A." Table 4.4 on page EIS-15 indicates that the primary environmental advantage of plan A-1 is impacting 74 acres less of bottomland hardwoods and 9 acres less of wetlands. This is accomplished at an increase in project cost of \$336,000 or about 2% increase in project cost not counting the value of existing right-of-way (The figures for traditional federal cost-sharing appear to be + \$20,000 in error on pp. 28, 41, and EIS-14).

Although the Institute applauds such consideration of fish and wildlife resources and is desirous of such Corps action on other projects, we question if the proposed action is the most cost effective and the relative public benefits since little public use is made of the area. As an alternative, The Institute recommends that the Corps take the \$336,000 which it has stated is a "minor increase in cost" and purchase a larger acreage of bottomland hardwoods in adjacent danger of clearing for agriculture as mitigation. Such land should be adjacent to one of the existing Louisiana Department of Wildlife and Fisheries Wildlife Management Areas and turned over to that agency for management.

Thank you for allowing us to review this document.

Sincerely,
Murray T. Walton
Murray T. Walton
Southeastern Representative

DEDICATED TO WILDLIFE SINCE 1971

Response 13.1—These corrections have been made.

Response 13.2—The least environmentally damaging plan was formulated in accordance with Section 10-2 of the Digest of Water Resources Policies and Authorities (WF 1165-2-1, 27 Mar 81) which reads as follows:

10-2. Mitigation. Damages to fish and wildlife resources will be prevented to the extent practicable through good planning and design. Measures to offset unavoidable damages to fish and wildlife will be included in projects when the cost of measures for this purpose are justified by the monetary or non-monetary effects attributable thereto. Such measures are in-kind whenever possible and are provided adjacent to or as near as practicable to the area where the damages occur.

Plan A1 was formulated to prevent damages to wildlife resources through good planning. Mitigation is designed to offset unavoidable damages. The destruction of the 74 acres of bottomland hardwoods is not unavoidable. We believe it is better to avoid damaging the 74 acres of bottomland hardwoods than to allow these acres to be destroyed and purchase and preserve lands elsewhere which may or may not be destroyed in the future. The recommended plan will definitely result in the preservation of 74 acres of hardwoods, while the Institute's plan will result in a net loss of 74 acres. Because the Corps will have direct responsibility for the implementation of plan A1, we can insure that bottomland hardwoods are preserved.

If the Corps were to mitigate, the mitigation would have to be in-kind. The 74 acres of bottomland hardwoods destroyed would be mitigated by the purchase of the same number of acres. The difference in costs between plans A and A1 cannot be used as justification for buying additional acreage. These costs are only estimated costs; they will not be finalized until the construction contract is awarded.

Table B-3 summarizes the first costs, annual charges, benefits and benefit-cost ratios for the two detailed plans. Detailed estimates of first costs are shown in table C-5. A summary comparison of the plans is shown in table B-4.

RATIONALE FOR NATIONAL ECONOMIC DEVELOPMENT PLAN

Plan A would provide the maximum average annual excess benefits over costs and therefore, was designated the national economic development plan.

TABLE B-3--FIRST COST AND ANNUAL CHARGES--DETAILED LEVEE PLANS
(October 1980 price levels; 7 3/8 percent interest rate)

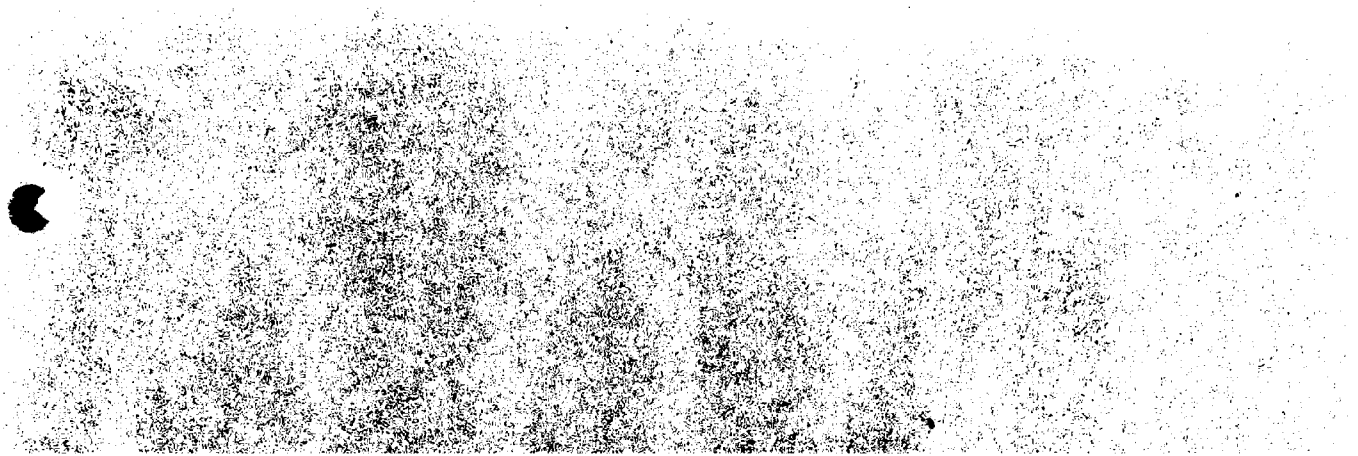
	<u>Plan A</u>	<u>Plan A1</u>
	<u>(\$)</u>	<u>(\$)</u>
<u>First Cost</u>		
Lands	1,159,000	1,159,000
Construction	11,985,000	12,225,000
Contingencies	2,996,000	3,056,000
Engineering and Design	899,000	917,000
Supervision and Administration	<u>899,000</u>	<u>917,000</u>
Total First Cost	17,938,000	18,274,000
Present Value of Investment	19,971,000	20,345,000
<u>Annual Charge</u>		
Interest and Amortization	1,474,000	1,501,000
Operation, Maintenance, and Replacement	<u>14,000</u>	<u>14,000</u>
Total Annual Charges	1,488,000	1,515,000
Total Annual Benefits	2,089,000	2,089,000
Net Benefits	601,000	574,000
Benefit-Cost Ratio	1.40	1.38

TABLE B-4--SUMMARY COMPARISON OF ALTERNATIVE PLANS

ITEM	PLAN A (NED)		PLAN A1 (LED, Tentatively Recommended Plan)		NO ACTION (Nonstructural Plan)	
	PLAN A (NED)		PLAN A1 (LED, Tentatively Recommended Plan)		NO ACTION (Nonstructural Plan)	
I. PLAN DESCRIPTION	This plan would increase flood protection to agriculture, structures and contents, and reduce the likelihood of inmate evacuation and subsistence costs. The mainline levee would be raised and strengthened to a maximum height of 71.5 NGVD from its present height of 63 NGVD.		This plan provides the same level of protection as plan A; however, environmentally mitigating measures were added to make this plan the least damaging environment-ally. Borrow pit excavation will avoid wooded areas and the wetland areas contiguous to Charity Lake and Sugar Lake.		No action would subject residents to the threat of a levee crevasse. Potential losses to agriculture and to structures and contents would remain high. The no action plan incorporates nonstructural measures that now exist or are expected to be in existence in the future without any Federal action; that is a combination of flood-forecasting coupled with flood-fighting and evacuation.	
II. SIGNIFICANT IMPACTS						
1. National Economic Development (NED) 1/						
a. Total average annual benefits	\$2,089,000 (a,1,2,3,6,9)		\$2,089,000 (a,1,2,3,6,9)		0	
b. Total average annual costs	\$1,488,000		\$1,515,000		0	
1) Interest and amortization	\$1,474,000		\$1,501,000		0	
2) Operation and maintenance	\$14,000		\$14,000		0	
c. First Cost	\$17,938,000		\$18,274,000		0	
d. Net annual NED benefits	\$601,000 (a,1,2,3,6,9)		\$574,000 (a,1,2,3,6,9)		0	
e. Benefit-cost ratio	1.40		1.38			

TABLE B-4--SUMMARY COMPARISON OF ALTERNATIVE PLANS (Continued)

ITEM	PLAN A (NED)	PLAN A1 (LED, Tentatively Recommended Plan)	NO ACTION (Nonstructural Plan)
2. Environmental Quality	Three hundred forty-five acres of land would be used for borrow excavation and for haul roads, including 71 acres of woodlands, 10 acres of wetlands and open water, and 266 acres of open land. (a,1,6,9)	Environmental and water quality impacts are less than plan A. Approximately 5 acres of woodlands, 1 acre of open water, wetland, and 345 acres of open land would be affected. (a,1,6,9)	The 700 acres of wetlands and open water presently in the study area would remain the same with no action. (a,1,2,3,5,9)
3. Social Well-Being			
a. Redevelopment* and effects on distribution of real income	Increased employment and income opportunities to middle and lower income families. (1,2,3,6,9)	Similar to plan A. (Slightly greater)	None.
b. Injurious displacement of peoples and community disruption	Plan reduces likelihood of levee crevasse and the economic and social upheaval associated therewith. (1,2,3,6,8,9)	Same as plan A.	Area is subject to possible crevasse and attending disruption.
4. Regional Development			
a. Effects on employment and income	Additional employment and income. (1,2,3,6,9)	Similar to plan A. (Slightly greater)	None.
b. Other effects	Not evaluated.	Not evaluated.	Not evaluated.



INDEX OF FOOTNOTES

*Items specifically mentioned in Section 122 of Public Law 611, 91st Congress.

a) Impact occurs within study area.

b) Impact occurs within the rest of Nation.

Timing

1) Impact is expected to occur prior to or during plan implementation.

2) Impact is expected within 15 years following plan implementation.

3) Impact is expected in longer time-frame (15 or more years following implementation).

Uncertainty

4) The uncertainty associated with the impact is 50 percent or more.

5) The uncertainty is between 10 percent and 50 percent.

6) The uncertainty is less than 10 percent.

Exclusivity

7) Overlapping entry; fully monetized in NED account.

8) Overlapping entry; not fully monetized in NED account.

Actuality

9) Impact will occur with implementation.

10) Impact will occur only when specific additional actions are carried out during implementation.

11) Impact will not occur because necessary additional actions are lacking.

1/ Costs and benefits are computed at October 1980 price levels, a 7 3/8 percent interest rate, and a 100-year project life.

RECEIVED [illegible]

[illegible]

[illegible]

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TABLE B-5

RECOMMENDED PLAN - BENEFITS AND COST
(Interest rate - 7 5/8 Percent, Oct 81 price levels)

	Recommended Plan Plan A1 (\$)
<u>First Cost</u>	
Lands	1,159,000
Construction	14,227,000
Contingencies	3,574,000
Engineering and Design	1,070,000
Supervision and Administration	1,070,000
Total First Cost	21,100,000
Present Value of Investment	23,575,000
<u>Annual Charges</u>	
Interest and Amortization	1,799,000
Operation, Maintenance, and Replacement	15,000
Total Annual Charges	1,814,000
Total Annual Benefits	2,298,000
Net Benefits	484,000
Benefit-Cost Ratio	1.27

APPENDIX G

DIVISION OF PLAN RESPONSIBILITIES

The purpose of this section is to present the division of plan responsibilities between Federal and non-Federal interests in connection with the development of the proposed project and documentation of the intent of non-Federal interests to fulfill their responsibilities.

FEDERAL RESPONSIBILITIES

Upon congressional authorization and funding, the United States will prepare detailed designs and plans. Upon receipt of assurances from non-Federal interests that they will fulfill their responsibilities for the project, the United States will construct the levees, borrow pits, and drainage structures to project specifications.

NON-FEDERAL RESPONSIBILITIES

Prior to the commencement of the construction of the recommended project, non-Federal interests will agree to comply with the following requirements of the Flood Control Act of 1928:

a. Maintain all flood control works after the completion, except controlling and regulating spillway structures, including special relief levees; maintenance normally includes such matters as cutting grass, removal of weeds, local drainage, and minor repairs of main river levees.

b. Agree to accept land turned over to them under provision of Section 4.



DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P. O. BOX 60267
NEW ORLEANS, LOUISIANA 70160

IN REPLY REFER TO
LMNPD-F

23 December 1981

Mr. Archie D. Parker
Department of Corrections
P.O. Box 44304
Baton Rouge, LA 70804

Dear Mr. Parker:

This is in reference to your telephone conversation with Ms. Lynn Devaul of this office on 16 December 1981 concerning the letter of intent for the Angola levee study. As she told you, the US Army Corps of Engineers is in the process of revising its cost-sharing policies. This has necessitated some revisions to the items of local cooperation specified in the letter of intent. The letter of intent should indicate your acceptance and support for the Louisiana State Penitentiary project and your willingness to financially participate to some level at least consistent with traditional requirements and general laws and policies.

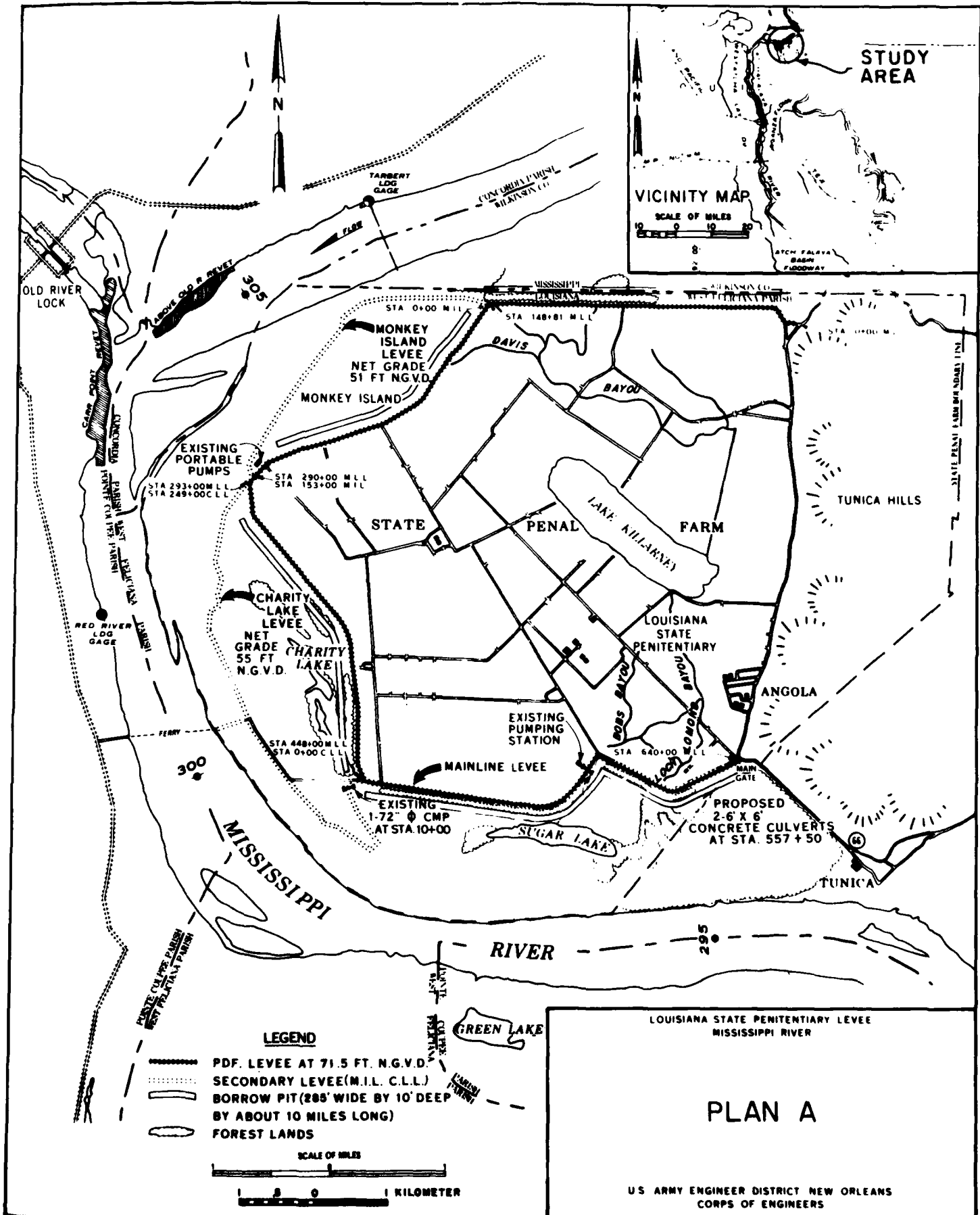
The traditional requirements for local cooperation are specified in Section 3 of the Flood Control Act of 15 May 1928 and are as follows:

a. Maintain all flood control works after their completion, except controlling and regulating spillway structures, including special relief levees; maintenance includes normally such matters as cutting grass, removal of weeds, local drainage, and minor repairs of main river levees;

b. Agree to accept land turned over to them under provision of Section 4; and

c. Provide without cost to the United States, all rights-of-way for levee foundations and levees.

A copy of Sections 1 through 4 of the Flood Control Act of 1928 is inclosed for your information.



LMNPD-F

23 December 1981

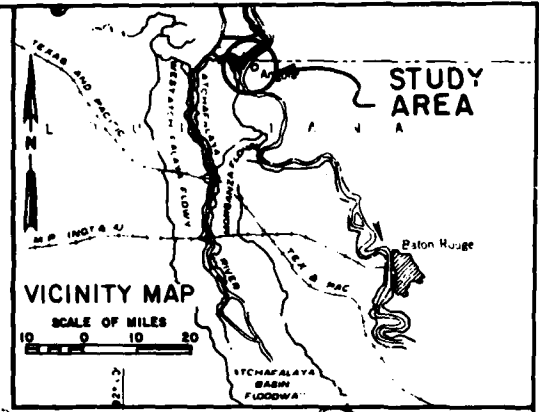
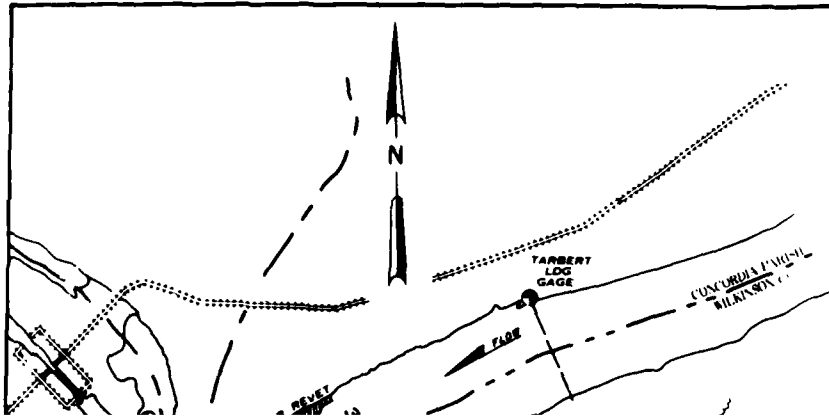
Mr. Archie D. Parker

We would like to receive the revised letter of intent as soon as possible so that we may submit the final report. If you have any questions, please call Ms. Lynn Devaul at 838-2506.

Sincerely,

1 Incl
As stated

R. H. SCHROEDER, JR.
Acting Chief, Planning Division



Page 2

Your enclosure of Section 1 through 4 of the Flood Control Act of 1928 is appreciated. Please telephone me at (504) 342-6647 should you require anything additional.

Sincerely,



A. D. Parker
Assistant Secretary/Adults

ADP:bm

cc Mr. John T. King
Secretary of Corrections

Mr. Mike Martin
Undersecretary

Ross Maggio, Warden
La. State Penitentiary

Ms. Martha Morgan
Attorney for Corrections

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APPENDIX C

RECORDING INVESTIGATIONS

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APPENDIX C

ENGINEERING INVESTIGATIONS

This appendix summarizes the results of engineering investigations of alternative plans to rehabilitate/improve the Louisiana State Penitentiary levee system.

HYDROLOGY

STAGES

Based on data from the Red River Landing gage the maximum stage of record on the Mississippi River in the study area is 60.94 feet National Geodetic Vertical Datum (NGVD)¹ which occurred during 14-17 May 1927; the minimum stage of record, 2.89 feet NGVD, occurred on 14 November 1895. For the period 1938-1979, the average stage is 26.9 feet NGVD, and mean annual high water is 46.3 feet NGVD. The Mississippi River Commission (MRC) approved low water reference plane is 10.6 feet NGVD. The MB&T design stage at Red River Landing is 64.8 feet NGVD.

DISCHARGE

The maximum observed discharge for the Mississippi River at Talbert Landing (mile 306.3) of 1,977,000 cubic feet per second (cfs) occurred on 19 February 1937; the minimum observed discharge of 85,000 cfs occurred on 4 November 1939. The average discharge for the period 1938-1979 is 534,000 cfs.

¹All elevations and stages in this report are in feet National Geodetic Vertical Datum (previously mean sea level) unless otherwise noted.

HYDRAULICS

The Louisiana State Penitentiary mainline levee, which is 12.1 miles long, begins at the base of the Tunica Hills in the northeast portion of the penitentiary property and connects in the vicinity of the main gate (see plate 1). The mainline levee generally provides protection to about 15.3 square miles of inclosed area from Mississippi River floodwaters to an elevation of 63 feet NGVD. The adjacent Monkey Island levee, which ties into the mainline levee, has a control grade of 51 feet NGVD and provides a degree of protection to about 1.3 square miles. The adjacent Charity Lake levee, which also ties into the mainline levee, has a control grade of 55 feet NGVD and provides a degree of protection to about 2.2 square miles.

DETAILED LEVEE PLANS (ALTERNATIVES A AND A1)

The design flood flowline would increase as a result of changes in overbank flow conditions caused by increases in levee heights associated with the implementation of plan A or plan A1. These stage increases could impact other MR&T study areas. Flowlines for existing conditions and for conditions with these plans in place were computed using the HEC-2 computer program developed by the Hydrologic Engineering Center in Davis, California. A tabulation of these computed flowlines is provided in table C-1. The results indicate that neither plan A or plan A1 will cause any significant increases in the design flowline. Therefore, the operation of Old River control structure and/or Red River backwater fuseplug levee will not be affected. To be consistent with other features of the MR&T project in the area, a freeboard of 4 feet above the project design flowline will be added for final levee grade. The recommended freeboard will minimize overtopping of the levee due to wave runup, inaccuracies in estimating the flowline, and temporary loss of channel cross section. Four feet of freeboard is required due to the complex floodflow diversions in the vicinity of the Old River and the Morganza control structures. This reach of the river is subject to short

TABLE C-1--DESIGN FLOWLINE ELEVATIONS,¹ FOR DETAILED PLANS
(IN FEET NGVD)

<u>Levee Station</u>	<u>Existing Flowline</u>	<u>Plans A & A1</u>
640+00 mainline levee	62.0	62.0
557+50 mainline levee (Pumping station)	62.4	62.4
448+00 mainline levee 0+00 Charity Lake levee	63.6	63.7
125+00 Charity Lake levee (Angola Ferry Landing)	64.1	64.2
293+00 mainline levee 249+00 Charity Lake levee	64.7	64.9
290+00 mainline levee 153+00 Monkey Island levee	64.9	65.1
148+81 mainline levee 0+00 Monkey Island levee	66.9	67.0
0+00 mainline levee	67.4	67.5

¹Note, 1 foot added to the design flowline for loop effect

term changes which may result in loss of levee freeboard as opposed to other reaches where the flowline is more stable.

INTERIOR DRAINAGE

Within the mainline levee, drainage is provided for a contributory drainage area of 11,570 acres (1,730 acres of runoff is from Tunica Hills). Drainage is accomplished by pumping and gravity. Pumping is provided by a pumping station with a 120,000 gpm capacity (three 40,000 gpm pumps) at 35-foot total dynamic head with two 36-inch diameter discharge lines which run over the levee. Gravity drainage is currently provided by two 6- by 6-foot concrete culverts (72 square feet of opening).

Implementation of plan A or A1 would require modifications to the existing pumping station's discharge lines. The increased length of the discharge lines would cause the total dynamic head to increase from 35.0 to 35.3 feet. The increased head loss should cause a decrease in pumping capacity of about 300 gpm per pump, or less than 1 percent of the total capacity.

Extension of the existing gravity drainage structure was considered. It was ruled out, however, since the culverts would no longer be structurally sound with the additional load imposed by a higher levee. It would be necessary to replace the structure. The replacement structure would consist of two 6- by 6-foot concrete culverts 290 feet long with vertical sluice gates on the riverside and stop logs at either end for emergency closures. The increased head loss due to the longer culverts will be 0.1 foot at a discharge of 500 cfs and less at lower flows. This results in a 2 percent loss in capacity which is not considered significant enough to require a larger drainage structure.

The interior drainage modification features of plans A and A1 are also features of all the other alternative plans investigated (plans B through G). The recommended plan would not change existing drainage in

either the Monkey Island levee or Charity Lake levee areas. Features of the recommended plan are shown on plate 4.

PRELIMINARY LEVEE PLANS

Six alternative structural plans (plans B through G) were considered for improvement in addition to plans A and A1. Had one of these plans been recommended, a new structure would have been provided for drainage of the Monkey Island levee or Charity Lake levee areas. The Monkey Island area has no permanent drainage structure; a gap in the Monkey Island levee is opened or closed as needed by farm equipment. The Charity Lake area is drained via a 72-inch diameter corrugated metal pipe with a manually operated slide gate. Table C-2 provides a tabulation of the design flowlines for plans B through G.

In addition to the plans displayed herein, preliminary investigations were made to determine the feasibility of improving, rather than just maintaining, the existing interior drainage system. Companion cost-benefit analyses indicated that such improvements could not be economically justified; therefore, detailed investigations of such improvements were not made.

FOUNDATIONS AND MATERIALS

GENERAL

The levee system consists of the mainline levee (station 0+00 to station 640+00), Monkey Island levee (station 0+00 to station 153+00), and Charity Lake levee (station 0+00 to station 249+00). The design levee section for the project design flood has a 10-foot wide crown to a maximum elevation of 71.5 feet with side slopes of 1V on 5.5H landside and 1V on 4H riverside. The design levee section for 10-year flood protection differs only in that design grades for the levee crown would have a maximum elevation of 61.0 feet. The rehabilitation of the levee will include either riverside or landside enlargement and control measures for

TABLE C-2--DESIGN FLOWLINE ELEVATIONS,¹ FOR
ALTERNATIVE PLANS NOT RECOMMENDED
(IN FEET NGVD)

Levee Station	Existing Flowline	Plans B&G	Plans C&D	Plans E&F
640+00 mainline levee	62.0	62.0	62.0	62.0
557+50 mainline levee (Pumping Station)	62.4	62.4	62.4	62.4
448+00 mainline levee 0+00 Charity Lake levee	63.6	63.7	63.7	63.7
125+00 Charity Lake levee (Angola Ferry Landing)	64.1	64.2	64.2	64.2
293+00 mainline levee 249+00 Charity Lake levee	64.7	64.9	65.0	64.8
290+00 mainline levee 153+00 Monkey Island levee	64.9	65.1	65.1	65.0
148+81 mainline levee 0+00 Monkey Island levee	66.9	66.9	67.0	66.9
0+00 mainline levee	67.4	67.5	67.6	67.4

¹Note, 1 foot added to the design flowline for loop effect.

seepage problems observed along the levee system during the flood of 1973.

SOIL CONDITIONS

Six general type borings were made through the center of the levees to a depth of 60 feet. The borings indicate that the sediments consist primarily of point bar silts with clays overlying substratum sands. The point bar deposits contain alternating ridges of silt with some soft to medium clay, and swales of medium to stiff clay with some silt strata. Underlying the point bar deposits are fine to medium grained substratum sands down to elevations of minus 100 to minus 150 feet. Below these elevations clays of the Miocene-Pliocene age are encountered. The locations of the soil borings are shown on plate C-1. Soil boring logs are shown on plate C-2.

STRENGTHS AND STRATIFICATION

Clay shear strengths were based on unconfined compression tests made on typical clay samples. The shear strengths of other clays were based on a comparison of consistencies and results obtained from the samples that were tested. The semicompacted clay used for enlargement of the levee was assigned a shear strength value of $c=400$ psf, $\phi=0^\circ$ and a unit weight of 110 pcf. The soil properties used in the sand and silt strata are values normally used in stability analyses on the Mississippi River levees. The stratification on the mainline levee is based on boring 6-ANG; Monkey Island levee on boring 2-ANG; and Charity Lake levee on boring 4-ANG.

Seepage analyses were based on boring 1-ANG, observations made during the 1973 flood, and the geological profile which indicates the depth of the pervious substratum.

STABILITY ANALYSES

The Angola levee system would be rehabilitated by constructing a riverside or landside enlargement of the existing levee. The enlargement would result in a grade increase of 8.5 feet on the mainline levee, for the project design flood. Slope stability analyses were run on the most critical soil conditions for a riverside or landside enlargement of the existing levee to the maximum elevation and design section. The analyses indicate that the upgraded levee would meet the design factor of safety of 1.30; see plates C-3 and C-4.

UNDERSEEPAGE ANALYSES

During the 1973 flood, the performance of the existing Angola levee system was monitored by the Louisiana Department of Transportation and Development, Office of Public Works. In a memorandum summarizing their activities at the Angola levees between 24 January and 3 June 1973, the Department of Public Works reported serious seepage occurring throughout the levee system. Numerous sand boils developed and were sandbagged in the Camp F area (see plate C-1). Heavy seepage was reported in the mainline levee between station 0+00 and station 290+00. Within this area, the Monkey Island outer levee was overtopped on 30 March 1973. Little seepage was noted between stations 290+00 and 448+00. In this area, the Charity Lake outer levee withstood the 1973 floodwaters, thus preventing the floodwaters from affecting the mainline levee. The mainline levee lies on a point bar deposit and can be susceptible to seepage. Numerous sand boils and serious seepage were reported in the area between the Charity Lake levee and the mainline levee. Seepage from station 470+00 to station 540+00 that occurred during the 1973 flood was later reported to US Army Corps of Engineers personnel during a field trip to Angola in September 1976. Seepage problems that were observed during the 1973 flood are summarized in table C-3.

The two methods considered for controlling underseepage at the Angola levee system are relief wells and landside seepage berms (see

TABLE C-3--SEEPAGE OBSERVATIONS DURING THE 1973 FLOOD

<u>REACH</u>	<u>LEVEE</u>	<u>STATION TO STATION</u>	<u>BORING</u> ¹	<u>OBSERVATIONS DURING 1973 FLOOD</u>
1	Mainline	0+00 to 148+81	1-ANG	Heavy seepage, numerous sand boils developed in Camp F.
2	Mainline	148+81 to 290+00	3-ANG	Heavy seepage, outer levee (Monkey Island) overtopped.
3	Mainline	290+00 to 448+00	5-ANG	No seepage, outer levee (Charity Lake) withstood the 1973 flood. Sand boils reported in the area between the Charity Lake levee and the mainline levee.
4	Mainline	448+00 to 470+00		No seepage.
5	Mainline	470+00 to 540+00		Seepage and sand boils were reported.
6	Mainline	540+00 to 640+00	6-ANG	No seepage was reported.
7	Monkey Island	0+00 to 153+00	2-ANG	Levee overtopped.
8	Charity Lake	0+00 to 290+00	4-ANG	Levee withstood the 1973 flood. Sand boils developed in the area between the Charity Lake and the mainline levee.

^{1/} See plate C-1 for location of borings.

plate C-5). Seepage analyses based on the general type borings and DIVR 1110-1-400, dated 30 November 1976, indicate that a seepage berm is not required (see DIVR 1110-1-400, appendix A). However, as stated in DIVR 1110-1-400, a standard seepage berm should be constructed in areas where seepage was observed. Relief well calculations are based on Technical Memorandum, No. 3-424, Volume 1. If relief wells are used to control seepage in lieu of seepage berms, they should be placed at a spacing of 200 feet down to elevation minus 61 feet for a 50 percent penetration of the pervious substratum. Only seepage berms were used in the analysis of solving the seepage problem for the 10-year design levee section.

METHODS OF CONSTRUCTION

The levee should be enlarged by semicompacted fill methods. The levee will be constructed to a gross grade of 1 foot above the design grade to compensate for anticipated settlement. Borings will be required to select borrow pits that will provide suitable sources of material. The borrow pits will be positioned in such a manner as to avoid aggravating underseepage problems. Landside seepage berms should be constructed of suitable material by uncompacted fill methods.

Measures to control underseepage of the levees should be constructed on the mainline levee from station 0+00 to station 293+00 and from station 470+00 to station 540+00. It was decided to use seepage berms because relief wells would increase the amount of underseepage entering the protected area, thus requiring more water to be handled by the interior drainage system and pumping station. They would also require more maintenance and testing which would increase necessary maintenance cost, whereas seepage berms are generally much less costly to construct and maintain than relief wells.

RECOMMENDATIONS FOR ADDITIONAL STUDIES

It is suggested that the changes in project design flowline are minor enough to retain the existing flowline shown in table C-1 and presented in the "Refined 1973 MR&T Project Flood Flowline" (New Orleans District), June 1978. The mean velocities in the vicinity of the Louisiana State Penitentiary levee obtained from HEC-2 backwater runs varied from 8 to 11 feet per second. These velocities are slightly higher than mean velocities attained in large rivers under flood stages. This can be attributed to transverse or secondary currents in the bend of the river. As the velocity distribution in open channels is extremely complex, the dynamic effects associated with these transverse currents may cause a small increase in bank scour within and downstream of the bend (i.e., the Carr Point Revetment). The slight increase in velocities attained, and their immediate effect, does not warrant any action in this feasibility report. However, before preparation of the general design memorandum, the selected plan will be checked on the Mississippi Basin Model at Clinton, Mississippi, using the approved project flood hydrograph to determine the effects of constricting the flood plain.

No seepage was reported on the mainline levee from station 293+00 to station 448+00 during the 1973 flood because the outer Charity Lake levee withstood the floodwaters. Since this area lies on a point bar deposit, additional borings may be needed to determine if a high head on the levee will create seepage problems.

The location and depth of borrow pits, levee design, and seepage berm requirements are preliminary. Additional borings which will be taken during the design memorandum studies will be used to refine these designs. Possible effects on the drainage patterns in the northeastern part of the study area will be investigated in the design plans.

DETAILED COST ESTIMATES

Detailed cost estimates for each of the preliminary plans are shown in table C-4. The first cost estimates for the two detailed plans are shown in table C-5. Table C-6 is an updated cost estimate (1981 price levels) for the recommended plan, plan A1.

TABLE C-4--PRELIMINARY LEVEE PLANS FIRST COST
(October 1980 price levels)

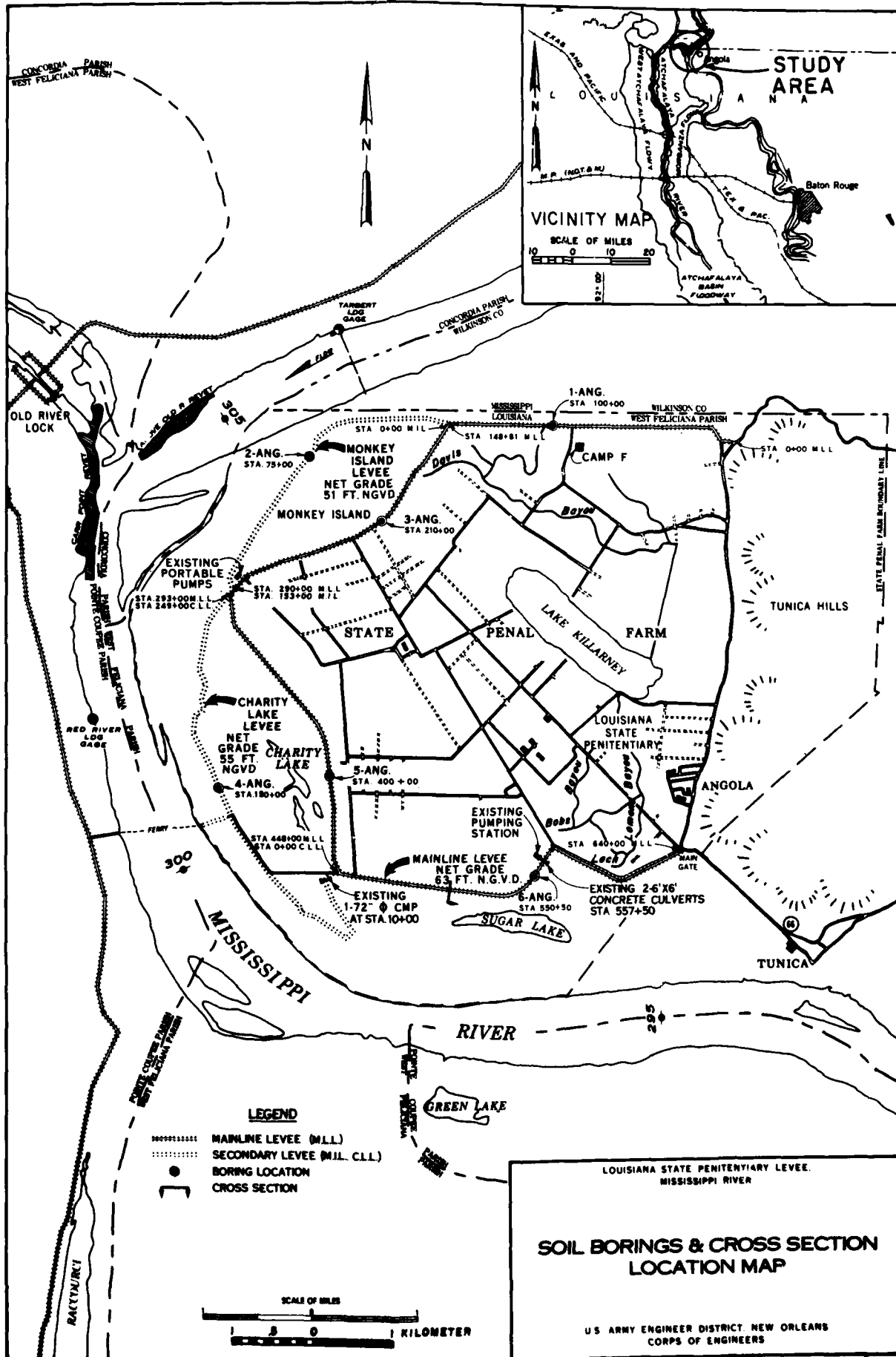
Item	Unit Price (\$)	Acres	Plan A		Plan B		Plan C		Plan D		Plan E		Plan F		Plan G	
			Quantity	Amount (\$)	Quantity	Amount (\$)	Quantity	Amount (\$)	Quantity	Amount (\$)	Quantity	Amount (\$)	Quantity	Amount (\$)	Quantity	Amount (\$)
Clearing and Grubbing	Acres	1,000	835	835,000	836	836,000	922	922,000	947	947,000	947	947,000	944	944,000	1,084	1,084,000
Subcontract (land comp)	C.Y.	2.25	3,271,500	7,361,000	3,364,000	12,721,000	4,443,000	10,001,000	6,827,000	15,361,000	4,998,000	11,246,000	3,271,000	7,360,000	4,998,000	11,246,000
Levee Shaping	Sq. ft.	500											249	125,000	249	125,000
Banks (Uncomp)	C.Y.	1.25	780,000	975,000	950,000	1,188,000	1,400,000	1,750,000	1,500,000	1,875,000	1,227,138	1,534,000	1,358,419	1,698,000	1,805,552	2,257,000
Surfacing (sand, clay, and gravel)	C.Y.	15.00	18,000	27,000	18,000	270,000	20,000	300,000	21,000	315,000	22,250	334,000	24,916	374,000	29,166	438,000
Fertilizing and Seeding	Acres	400	433	173,000	496.4	199,000	557.4	223,000	620.8	248,000	570.9	228,000	570.7	228,000	708.7	284,000
Bedding Structures	L.S.		2,311,000	3,841,000		3,841,000		3,841,000		5,371,000		3,841,000		3,841,000		5,371,000
Pumping						125,000		150,000		275,000		125,000		150,000		275,000
Environmental Protection (0.5 percent)	L.S.			60,000		83,000		75,000		106,000		80,000		66,000		94,000
Subtotal			11,985,000		19,283,000		17,262,000		24,500,000		18,335,000		14,786,000		21,174,000	
Contingencies (425%)			2,996,000		4,821,000		4,313,000		6,125,000		4,584,000		3,697,000		5,294,000	
Subtotal			14,981,000		24,104,000		21,578,000		30,625,000		22,919,000		18,483,000		26,468,000	
MSD (44%)			899,000		1,446,000		1,295,000		1,838,000		1,375,000		1,109,000		1,588,000	
MSL (44%)			899,000		1,446,000		1,295,000		1,838,000		1,375,000		1,109,000		1,588,000	
Right-of-way			3,159,000		3,054,000		1,097,000		990,000		1,335,000		1,456,000		1,628,000	
Total			17,938,000		28,052,000		25,265,000		35,291,000		27,004,000		22,137,000		31,272,000	

TABLE C-5--DETAILED LEVEE PLANS FIRST COST
(October 1980 price levels)

Item	Unit	Unit Price (\$)	Plan A		Plan A1	
			Quantity	Amount (\$)	Quantity	Amount (\$)
Clearing and Grubbing	Acre	1,000	835	835,000	835	835,000
Embankment (Semi Comp)						
Normal Hauling Distances	C.Y.	2.25	3,271,500	7,361,000	2,313,400	5,205,000
Longer Hauling Distances	C.Y.	2.50	-	-	958,000	2,395,000
Bermes (Uncomp)	C.Y.	1.25	780,000	975,000	780,000	975,000
Surfacing (sand, clay, and gravel)	C.Y.	15.00	18,000	270,000	18,000	270,000
Fertilizing and Seeding	Acre	400	433	173,000	433	173,000
Drainage Structures				2,311,000		2,311,000
Environmental Protection (0.5 percent)	L.S.			60,000		61,000
Subtotal				11,985,000		12,225,000
Contingencies (25%)				2,996,000		3,056,000
Subtotal				14,981,000		15,281,000
E&D (6%)				899,000		917,000
S&A (6%)				899,000		917,000
Rights-of-way				1,159,000		1,159,000
TOTAL				17,938,000		18,274,000

TABLE C-6--RECOMMENDED PLAN FIRST COST
(October 1981 price levels)

Item	Unit	Unit Price (\$)	Plan A1	
			Quantity	Amount (\$)
Clearing and Grubbing	Acre	1,200	835	1,002,000
Embankment (Semi Comp)				
Normal Hauling Distances	C.Y.	2.60	2,313,400	6,015,000
Longer Hauling Distances	C.Y.	2.80	958,000	2,778,000
Berms (Uncomp)	C.Y.	1.50	780,000	1,170,000
Surfacing (sand, clay, and gravel)	C.Y.	17.50	18,000	315,000
Fertilizing and Seeding	Acre	500	433	217,000
Drainage Structures				2,660,000
Environmental Protection (0.5 percent)	L.S.	70,000		<u>70,000</u>
Subtotal				14,227,000
Contingencies (25%±)				<u>3,574,000</u>
Subtotal				17,801,000
E&D (6%±)				1,070,000
S&A (6%±)				1,070,000
Rights-of-way				<u>1,159,000</u>
TOTAL				21,100,000



ELEVATIONS IN FEET NGVD

60

50

40

30

20

10

0

-10

-20

-30

-40

-50

-60

-70

-80

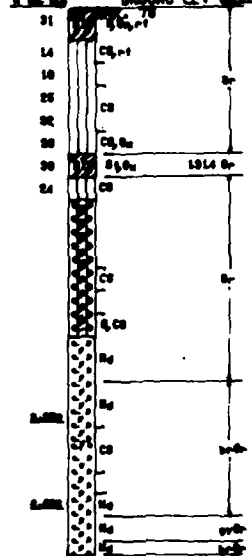
-90

BOR. 1-ANG

STA. 100+00

RAIN LINE

LEVEE ON C/L GROUND EL. 84.1



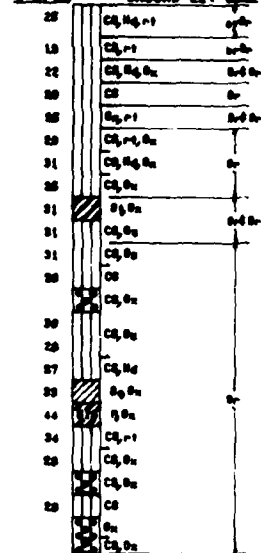
BOR. 2-ANG

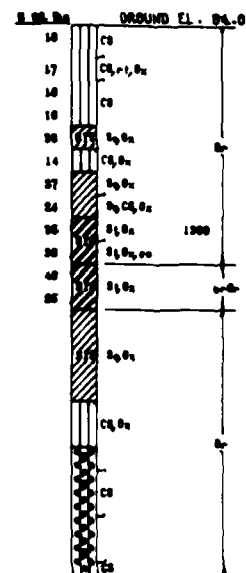
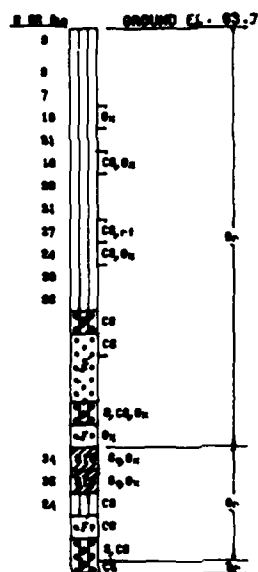
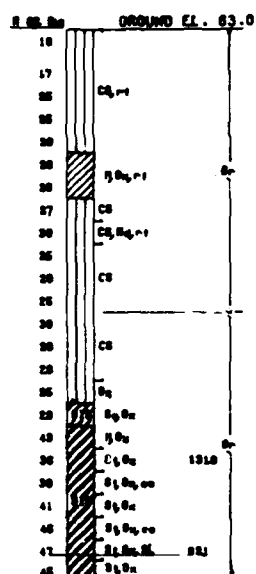
STA. 75+00

HONEY ISLAND LEVEE ON C/L

28 MAR. 78

GROUND EL. 87.2



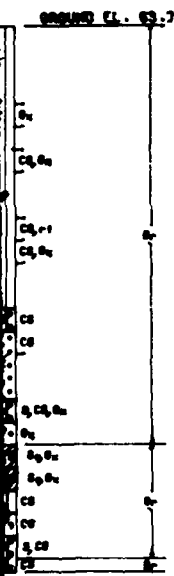


R. 4-ANG

STA. 150+00

TY LAKE LEV. ON C/L

MAR. 1978

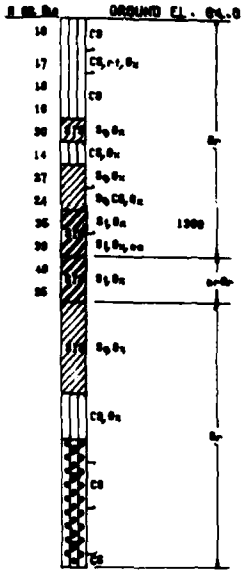


BOR. 5-ANG

STA. 400+00

MAINLINE LEVEE ON C/L

31 MAR. 1978

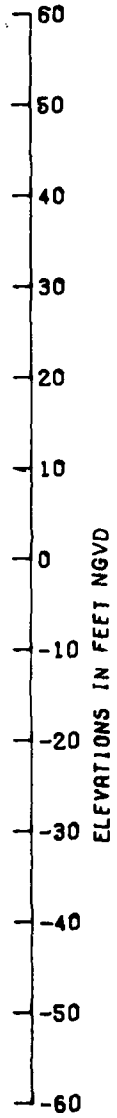
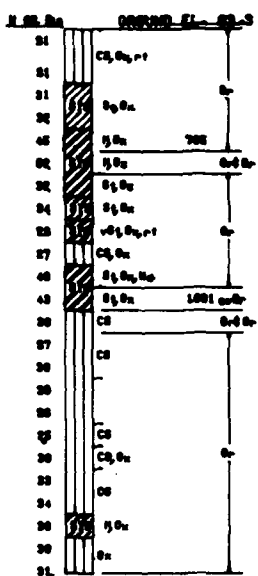


BOR. 6-ANG

STA. 550+00

MAINLINE LEVEE ON C/L

30 MAR. 1978



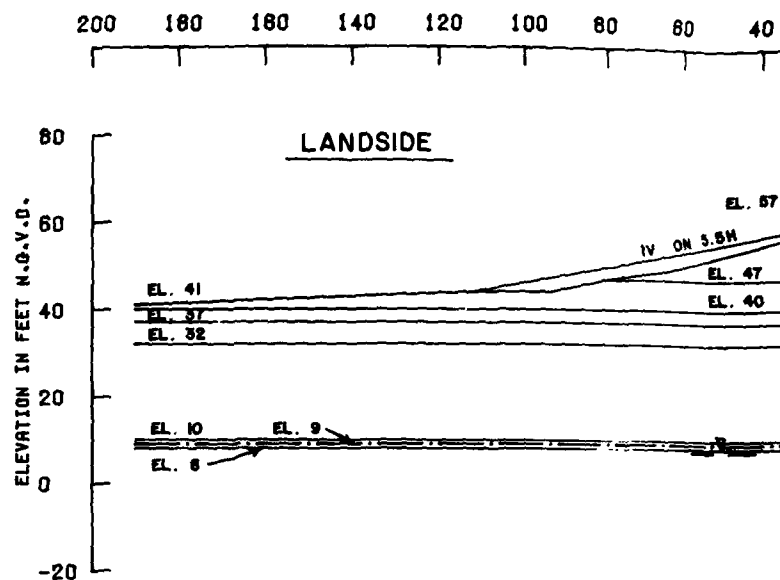
LOUISIANA STATE PENITENTIARY LEVEE, MISSISSIPPI RIVER

SOIL BORING LOGS

MILE 297 TO 306

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS

NEW ORLEANS

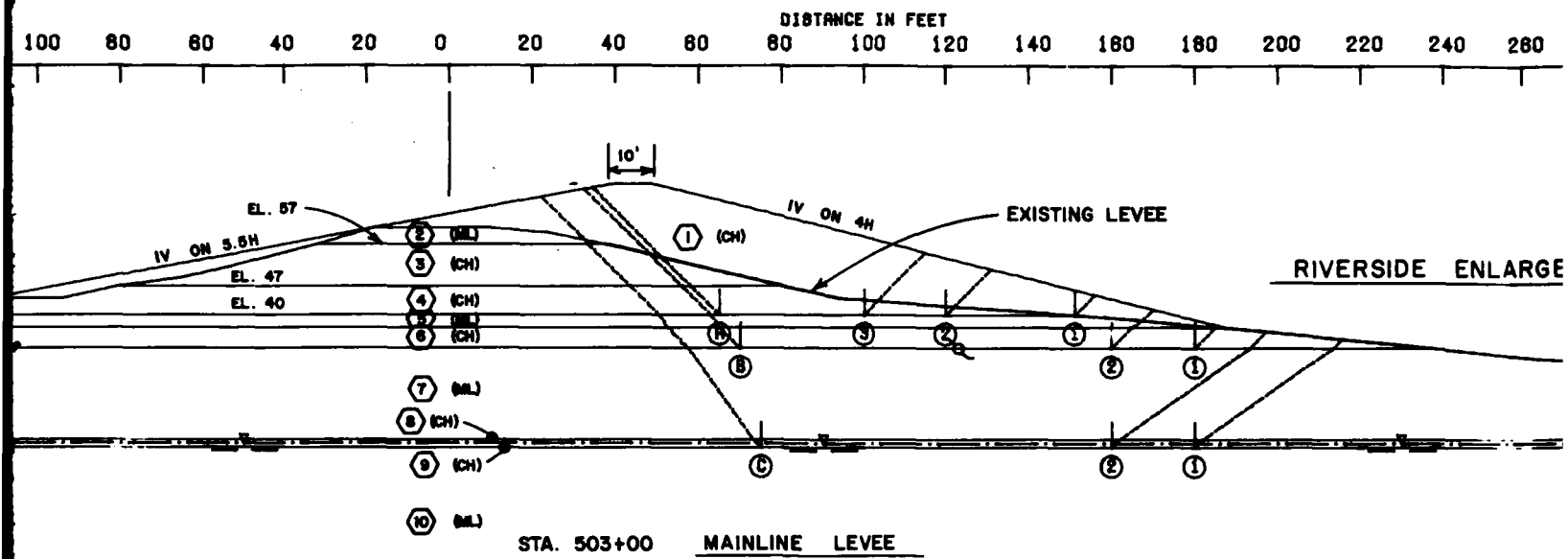


GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
BORING 6-ANG.

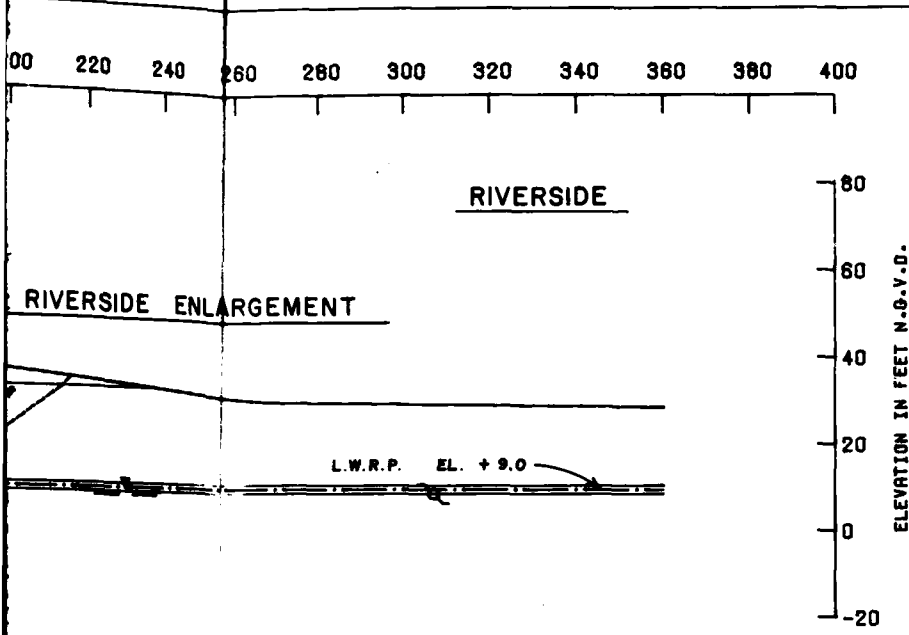
STRATUM NO.	SOIL TYPE	EFFECTIVE UNIT WT. P.C.F.		C - UNIT COHESION - P.S.F.			
				CENTER OF STRATUM		BOTTOM OF S	
		VERT. 1	VERT. 2	VERT. 1	VERT. 2	VERT. 1	V
①	CH	110.0	110.0	400.0	400.0	400.0	4
②	ML	117.0	117.0	200.0	200.0	200.0	2
③	CH	112.0	112.0	700.0	700.0	700.0	7
④	CH	112.0	112.0	1050.0	1050.0	1050.0	1
⑤	ML	117.0	117.0	200.0	200.0	200.0	2
⑥	CH	112.0	112.0	1050.0	1050.0	1050.0	1
⑦	ML	117.0	117.0	200.0	200.0	200.0	2
⑧	CH	112.0	112.0	1050.0	1050.0	1050.0	1
⑨	CH	50.0	50.0	1050.0	1050.0	1050.0	1
⑩	ML	55.0	55.0	200.0	200.0	200.0	2

2



C - UNIT COHESION - P.S.F.				FRICTION ANGLE DEGREES
CENTER OF STRATUM		BOTTOM OF STRATUM		
VERT. 1	VERT. 2	VERT. 1	VERT. 2	
400.0	400.0	400.0	400.0	0.0
200.0	200.0	200.0	200.0	20.0
700.0	700.0	700.0	700.0	0.0
1050.0	1050.0	1050.0	1050.0	0.0
200.0	200.0	200.0	200.0	20.0
1050.0	1050.0	1050.0	1050.0	0.0
200.0	200.0	200.0	200.0	20.0
1050.0	1050.0	1050.0	1050.0	0.0
1050.0	1050.0	1050.0	1050.0	0.0
200.0	200.0	200.0	200.0	20.0

ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.	ELEV.	R _A	R _B	R _P	D _A	-D _P	RESISTING	DRIVING	
(A) ①	40.00	37741	90300	3924	50958	1581	131984	49375	2.673
(A) ②	40.00	37741	57750	11484	50958	8316	108975	42840	2.508
(A) ③	40.00	37741	38750	18381	50958	15471	90852	35485	2.580
(B) ①	32.00	54185	98187	10820	79382	2032	184182	77380	2.122
(B) ②	32.00	54185	87882	14382	79382	8108	158210	73283	2.132
(C) ①	8.00	124008	110250	81072	210007	45272	285330	184735	1.793
(C) ②	8.00	124008	89250	73589	210007	55491	288828	154518	1.858



SUMMATION OF FORCES		FACTOR OF SAFETY
RESISTING	DRIVING	
91984	49375	2.878
08975	42840	2.500
0852	35486	2.580
94192	77380	2.122
58210	73289	2.132
55330	184735	1.798
08828	184518	1.958

NOTES

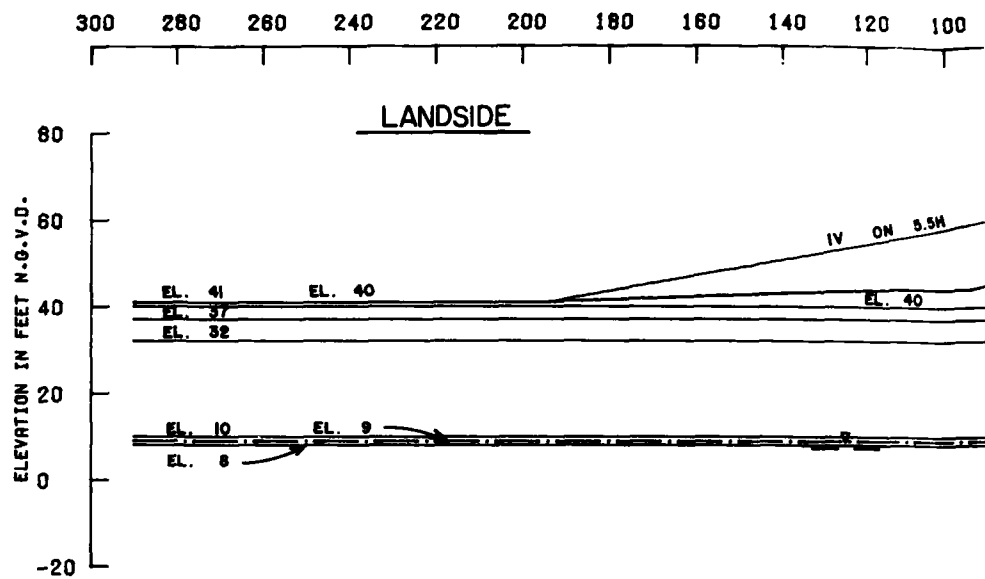
- -- STRUTUM NUMBER
- -- WEDGE NUMBER
- -- CROSSOVER POINT
- Φ -- ANGLE OF INTERNAL FRICTION, DEGREES
- C -- UNIT COHESION, P.S.F.
- ∇ -- STATIC WATER SURFACE
- D -- HORIZONTAL DRIVING FORCE IN POUNDS
- R -- HORIZONTAL RESISTING FORCE IN POUNDS
- A -- AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE
- B -- AS A SUBSCRIPT REFERS TO CENTRAL BLOCK
- P -- AS A SUBSCRIPT REFERS TO PASSIVE WEDGE

$$\text{FACTOR OF SAFETY} = \frac{R_a + R_b + R_p}{D_a - D_p}$$

LOUISIANA STATE PENITENTIARY
MISSISSIPPI RIVER

MAINLINE LEVEE, RS
LEVEE STABILITY ANALYSIS

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS



GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
BORING 6-ANG.

STRATUM NO.	SOIL TYPE	EFFECTIVE UNIT WT. P.C.F.		C - UNIT COHESION - P.S.		
				CENTER OF STRATUM		BOTTOM OF
		VERT. 1	VERT. 2	VERT. 1	VERT. 2	VERT. 1
①	CH	110.0	110.0	400.0	400.0	400.0
②	ML	117.0	117.0	200.0	200.0	200.0
③	CH	112.0	112.0	700.0	700.0	700.0
④	CH	112.0	112.0	1050.0	1050.0	1050.0
⑤	ML	117.0	117.0	200.0	200.0	200.0
⑥	CH	112.0	112.0	1050.0	1050.0	1050.0
⑦	ML	117.0	117.0	200.0	200.0	200.0
⑧	CH	112.0	112.0	1050.0	1050.0	1050.0
⑨	CH	50.0	50.0	1050.0	1050.0	1050.0
⑩	ML	55.0	55.0	200.0	200.0	200.0

9 (CH) 10 (ML)

2 1

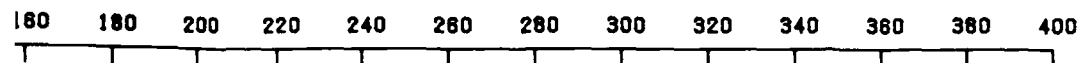
STA. 503 + 00 MAINLINE LEVEE

SECTION - P.S.F.		FRICTION ANGLE DEGREES
BOTTOM OF STRUTUM		
VERT. 1	VERT. 2	
400.0	400.0	0.0
200.0	200.0	20.0
700.0	700.0	0.0
1050.0	1050.0	0.0
200.0	200.0	20.0
1050.0	1050.0	0.0
200.0	200.0	20.0
1050.0	1050.0	0.0
1050.0	1050.0	0.0
200.0	200.0	20.0

ASSUMED FAILURE SURFACE		RESISTING FORCES			DRIVING FORCES		SUMMATION OF FORCES		FACTOR OF SAFETY
NO.	ELEV.	R _A	R _B	R _P	D _A	- D _P	RESISTING	DRIVING	
(A) ①	40.00	40473	91789	88	51721	0	132310	51721	2.558
(A) ②	40.00	40473	74007	8400	51721	1117	122880	50604	2.428
(A) ③	40.00	40473	63893	15846	51721	4468	120212	47255	2.544
(B) ①	32.00	58510	154024	89	80484	0	210823	80484	2.617
(B) ②	32.00	58510	78529	23433	80484	10839	158472	89845	2.240
(B) ③	32.00	58510	57748	32541	80484	18543	148797	81941	2.370
(C) ①	8.00	124311	94500	87383	211571	88710	308193	144881	2.114
(C) ②	8.00	124311	73500	95185	211571	73387	292978	138183	2.120

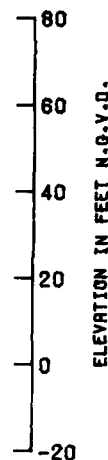
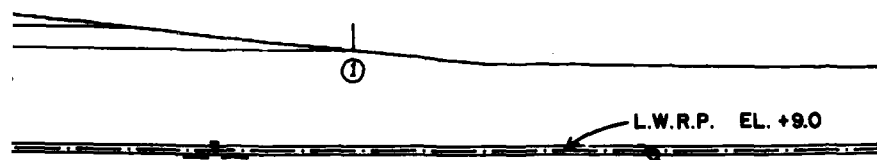
○ -- STRUT
 ○ -- WEDGE
 ⌘ -- CIRC
 ⌘ -- ANGLE
 C -- UNIT
 V -- STRUT
 D -- HORI
 R -- HORI
 A -- AB F
 B -- AB F
 P -- AB F
 FACTOR OF

3



RIVERSIDE

LANDSIDE ENLARGEMENT



SUMMATION OF FORCES		FACTOR OF SAFETY
DRIVING	RESISTING	
110	51721	2.558
180	50804	2.428
212	47255	2.544
323	80484	2.817
472	89845	2.240
797	81941	2.370
103	144881	2.114
976	136183	2.120

NOTES

- -- STRUTUM NUMBER
- -- WEDGE NUMBER
- ⌋ -- CROSSOVER POINT
- φ -- ANGLE OF INTERNAL FRICTION, DEGREES
- C -- UNIT COHESION, P.S.F.
- ∇ -- STATIC WATER SURFACE
- D -- HORIZONTAL DRIVING FORCE IN POUNDS
- R -- HORIZONTAL RESISTING FORCE IN POUNDS
- A -- AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE
- B -- AS A SUBSCRIPT REFERS TO CENTRAL BLOCK
- P -- AS A SUBSCRIPT REFERS TO PASSIVE WEDGE

$$\text{FACTOR OF SAFETY} = \frac{R_A + R_B + R_P}{D_A - D_P}$$

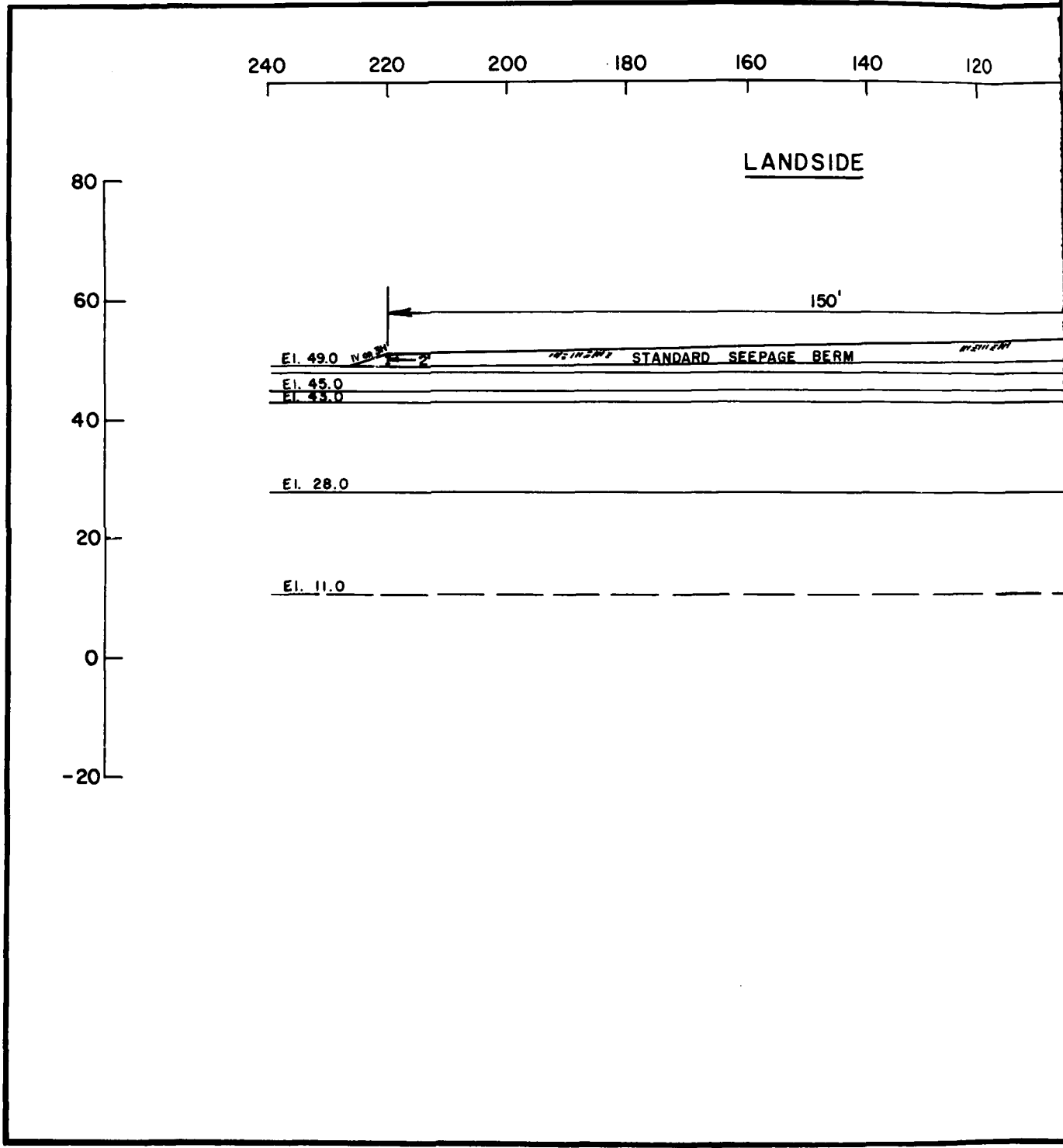
LOUISIANA STATE PENITENTIARY
MISSISSIPPI RIVER

MAINLINE LEVEE, LS
LEVEE STABILITY ANALYSIS

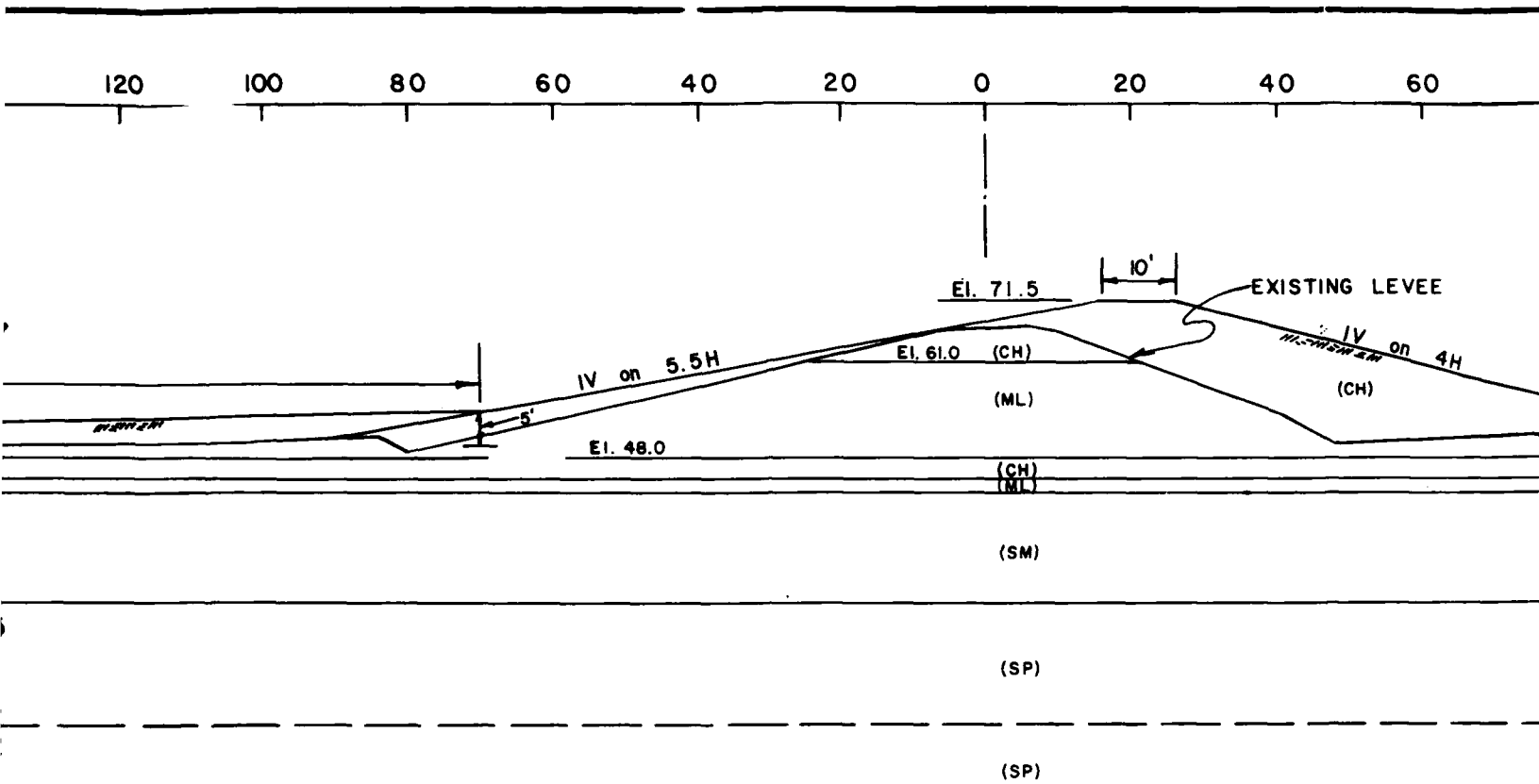
U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS

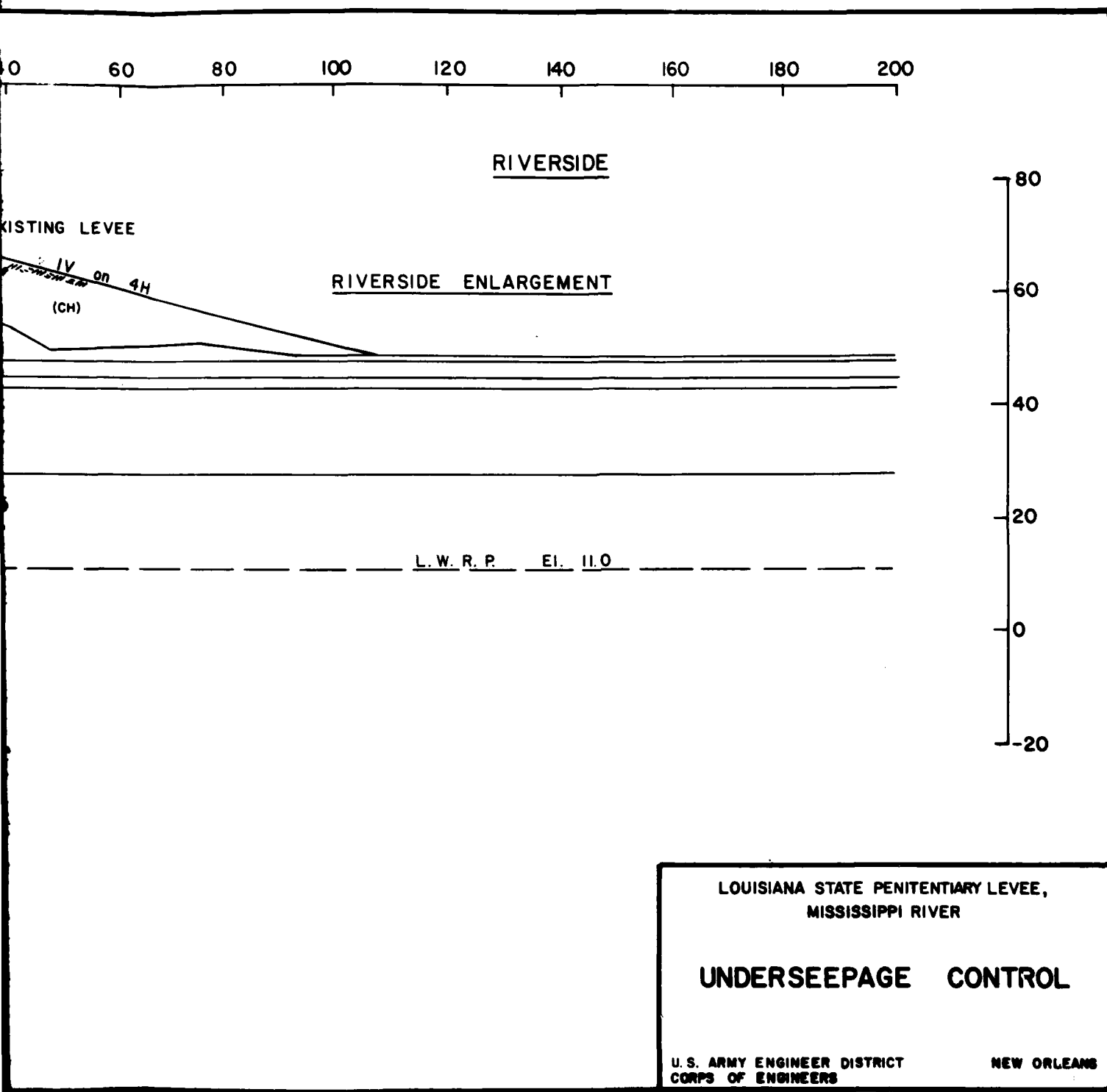
FILE NO. H-2-29413

PLATE C-4



2





APPENDIX D

ENVIRONMENTAL RESOURCES

**LOUISIANA STATE PENITENTIARY LEVEE,
MISSISSIPPI RIVER**

FEASIBILITY REPORT

**APPENDIX D
ENVIRONMENTAL RESOURCES**

This appendix includes the following:

- SECTION I - BIOLOGICAL ASSESSMENT OF THREATENED AND ENDANGERED SPECIES**
- SECTION II - US FISH AND WILDLIFE SERVICE FISH AND WILDLIFE COORDINATION
ACT REPORT**
- SECTION III - CULTURAL RESOURCES**

UNCLASSIFIED

LOUISIANA STATE PENITENTIARY LEVEE MISSISSIPPI RIVER
MAIN REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT
AND APPENDIXES(U) ARMY ENGINEER DISTRICT NEW ORLEANS LA
JAN 82 F/G 13/2

3/3

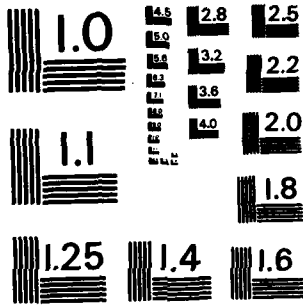
NL

END

DATE _____

FILMED

20



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

SECTION I

Biological Assessment of
Threatened and Endangered Species

BIOLOGICAL ASSESSMENT OF THREATENED AND ENDANGERED SPECIES

LOUISIANA STATE PENITENTIARY LEVEE, MISSISSIPPI RIVER

PURPOSE

This assessment is submitted by the US Army Corps of Engineers, New Orleans District, in compliance with Section 7c of the Endangered Species Amendments of 1978. In a letter dated 4 January 1980, the Corps of Engineers requested information from the US Fish and Wildlife Service regarding threatened or endangered species within the Louisiana State Penitentiary Levee study area, located at Angola, Louisiana. The US Fish and Wildlife Service responded that the red-cockaded woodpecker [Picoides (Dendrocopos) borealis] and the American alligator (Alligator mississippiensis) may be present within this area.

PROJECT SETTING

The study area is located on the left descending bank of the Mississippi River in West Feliciana Parish about 50 miles northwest of Baton Rouge. The study area totals approximately 19,430 acres. Within this area the mainline levee with a crown elevation of 63 feet National Geodetic Vertical Datum (NGVD)¹ provides flood protection for about 9,866 acres of the Angola state penal facilities. The area is relatively flat, lying in the Mississippi Alluvial Plain, and ground elevations vary from 40 to 55 feet NGVD. Approximately 1,400 acres of woodlands remain in the project area with the remainder being primarily cropland. There are approximately 740 acres of borrow pits, oxbows and natural lakes in the area.

RECOMMENDED PLAN

Studies were initiated to provide flood protection to the penal facilities and residents. This resulted in the formulation and analysis

¹ All elevations and stages in this report are in feet National Geodetic Vertical Datum (previously mean sea level) unless otherwise noted.

of seven structural plans as well as plans for evacuation and relocation. The evacuation and relocation plans are very unlikely to be recommended due to strong public opposition. The mainline levee plan is the least environmentally damaging plan of the structural plans considered. The plan described as the "most likely candidate" for recommendation consists of raising and strengthening the mainline levee to a height of 71.5 feet. Included in the plan is the replacement of an existing pair of 6- by 6-foot culverts through the levee with two new 6- by 6-foot concrete culverts with sliding vertical sluice gates.² The material to be used for increasing the height of the levee will be excavated from a borrow area to be located on the river side and parallel to the existing levee. The borrow area is planned to be no closer than 650 feet from the centerline of the existing levee. Dimensions of the borrow area would typically be 10 feet deep and 285 feet wide. The actual dimensions of the borrow area may vary in some locations in order to avoid forested areas and wetlands. Sides of the borrow pit would be graded to 1 on 3 slopes typically; however, some segments may be graded down to 1 on 6, or slopes between, for environmental enhancement.

CUMULATIVE IMPACTS

A comprehensive survey of the study area revealed that the red-cockaded woodpecker [Picoides (Dendrocopos) borealis] is not present; however, the American alligator (Alligator mississippiensis) is present in the immediate study area. The Louisiana Department of Wildlife and Fisheries reports that the red-cockaded woodpecker is found in West Feliciana Parish but not in the study area and attributes this to the lack of suitable habitat. That agency reports that the American alligator is definitely present in Sugar Lake and probably in other lakes within the project area. West Feliciana Parish, according to Louisiana studies, is estimated to have a population of approximately 38 alligators per square mile of alligator habitat.

² Type of culverts in this plan revised approximately 1 Sep 80 from type originally indicated in assessment.

Studies indicate that the project as proposed will not impact the red-cockaded woodpecker due to the complete absence of suitable habitat. The American alligator will be impacted beneficially by the project as proposed due to the creation of approximately 345 acres of aquatic habitat.

Studies indicate that the project as proposed will have no cumulative effects upon the red-cockaded woodpecker. The cumulative effects of the proposed project upon the American alligator would be beneficial. The deepwater habitat created as a result of borrow excavation would be used by alligators during courtship and breeding. The filling of the existing borrow pit in some areas as required by planned levee construction would deprive alligators of specific existing available habitat. The habitat to be created, however, would be much more extensive than the existing habitat and would furnish increased provisions for the alligator's life requirements. The replacement drainage structures through the levees are considered to be hydraulically equivalent to the existing structures; therefore, no impact should occur to existing interior wetland habitat.

STUDY METHODS AND DIFFICULTIES

The study methods used in this report were literature review, personal communication with experts in the field, "on the ground" reconnaissance of the study area, and correspondence with officials of the Louisiana Department of Wildlife and Fisheries.

No difficulties were encountered during the study process and data were obtained with a reasonable amount of effort to prepare the assessment.

CONCLUSIONS

In conclusion, it is determined that the implementation of the project as proposed will have no adverse effects upon any listed species or their critical habitat.



Joseph V. Colson

SECRETARY

DEPARTMENT OF WILDLIFE AND FISHERIES
400 ROYAL STREET
NEW ORLEANS 70130

David Treen

GOVERNOR

May 12, 1980

Mr. James F. Roy, Chief
Planning Division
New Orleans District
Corps of Engineers
P.O. Box 60267
New Orleans, La. 70160

RE: LMNPD-RE Louisiana State Penitentiary
Levee, Mississippi River - Endangered
Species.

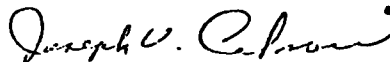
Dear Sir:

Although the red-cockaded woodpecker (Picoides (Dendrocopos) borealis) is listed as occurring in West Feliciana Parish, Louisiana we have no evidence, nor any reason to believe that the bird is found on the penitentiary property because of the absence of suitable habitat there.

The American alligator (Alligator mississippiensis) is a resident of Sugar Lake and during high water local residents report that many are sighted in the area. Most of those are probably transient from other areas along and on both sides of the river. We could not ascertain if alligators are resident in Charity Lake as we understand that it occasionally dries up. However, the habitat is there and the probability is that the animals do occur there.

Thank you for requesting our assistance in this matter.

Sincerely,


Joseph V. Colson
Secretary

JVC:NNW:clg

SECTION II

US Fish and Wildlife Service
Fish and Wildlife Coordination Act Report

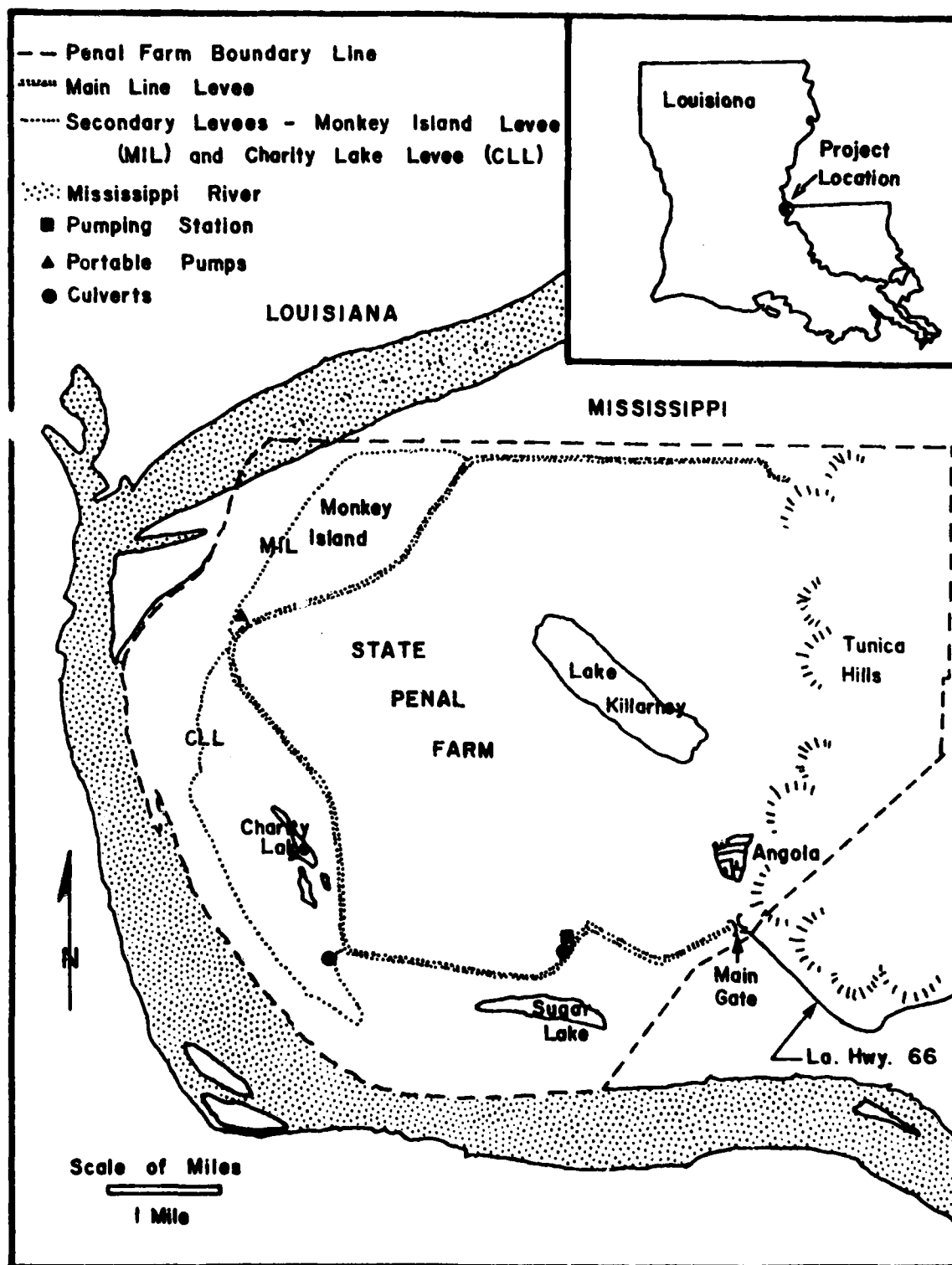


Figure 1. Louisiana State Penitentiary, West Feliciana Parish, Vicinity Map.



**UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE**

200 EAST PASCAGOULA STREET, SUITE 300

JACKSON, MISSISSIPPI 39201

December 14, 1981

18 DEC 1981

District Engineer
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Sir:

Reference is made to the study "Louisiana State Penitentiary Levee, Mississippi River", being conducted under the leadership of the New Orleans District Corps of Engineers (NODCE). The study was authorized by a resolution of the Committee on Public Works of the United States Senate on September 5, 1973, which requested that the Chief of Engineers (Department of the Army) determine the advisability of incorporating the existing local levee at the Louisiana State Penitentiary into the Federal mainline levee system. According to members of your staff, you plan to recommend raising and strengthening the mainline levee in the project area as part of the Federal mainline levee system. This letter represents the final report of the Fish and Wildlife Service on the proposed project, and is submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

DESCRIPTION OF AREA

The Louisiana State Penitentiary (LSP) at Angola encompasses approximately 19,400 acres on the left descending bank of the Mississippi River in West Feliciana Parish, Louisiana. The penal farm is bounded by the Mississippi River to the south and the west, and the Louisiana-Mississippi state line to the north; the eastern boundary runs through the Tunica Hills (Figure 1).

The LSP can be divided into two distinct geographic regions: the Mississippi River Alluvial Plain and the Tunica Hills. The latter region is a distinct physiographic province known as the "loess hills" (Delcourt and Delcourt, 1974).

Considerable land use changes have occurred within the study area. A study (delcourt and Delcourt, 1974), utilizing an early American Land office survey as a basis, indicated that the Mississippi River Alluvial Plain in the project area once consisted of baldcypress-tupelogum swamp. Through levee construction and natural alluviation, approximately 9,900 acres of the alluvial plain within the project area have been

protected from river overflow. An additional 2,280 acres in the Charity Lake and Monkey Island areas are also protected by levees but do receive occasional flood waters.

Approximately 9,900 acres of the penal farm are encircled by 12.1 miles of mainline levee (ML). This levee, at a height of 64 feet National Geodetic Vertical Datum (NGVD), provides the only significant flood protection for the prison. Drainage channels and Lake Killarney located within the ML collect excess water, which is discharged into Sugar Lake outside the ML via culverts and an adjacent pumping station. Sugar Lake is linked to the Mississippi River by Sugar Lake Bayou.

Two secondary levees adjoin the ML. The Monkey Island Levee (MIL), at a net grade of 51 feet NGVD, provides some flood protection to 860 acres of cropland. Drainage is accomplished by portable pumps or removal of a portion of the levee at its lower end. The Charity Lake Levee (CLL), at an elevation of 55 feet NGVD, provides protection to 1,420 acres of land (primarily pasture). This area is drained by a gated culvert that remains open at river stages below 36 feet NGVD. The area has no drainage when river stages exceed 36 feet NGVD.

PROJECT DESCRIPTION

According to information contained in the Draft Main Report the plan tentatively selected for recommendation to your higher authority is Plan A1. This plan consists of raising and strengthening the ML to a maximum height 71.5 feet National Geodetic Vertical Datum (NGVD). This would be accomplished by levee enlargement on the riverside or landside of the existing levee, with seepage berms to be provided where seepage has been observed. The levee would have a 10-foot crown width with side slopes of 1 vertical on 5.5 horizontal on the landside and 1 vertical on 4 horizontal on the riverside. This would provide protection from the standard project flood with 4 feet of freeboard. The existing pair of concrete culverts (6 feet by 6 feet) located in the ML would be replaced with two new 6-by 6-foot concrete culverts with vertical sluice gates. Modifications will be required in two 36-inch diameter pipes which transport water from the pumping station near Sugar Lake and over the ML, so that these pipes will pass over the top of the new levee.

The recommended plan includes measures to reduce adverse environmental impacts. Levee enlargement will be accomplished on the landside of the ML where existing borrow pits adjoin the riverside of the levee. Fill material will be obtained from new borrow pits parallel to and along the riverside of the levee. Extra care will be taken to avoid bottom-land hardwoods and wetlands along Charity and Sugar Lakes when excavating the new borrow pits. The ML will also be constructed so that wetlands and existing borrow pits hydrologically connected to Charity or Sugar Lakes will not be affected by fill placement.

FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

Description of Habitat

The LSP penal farm has several wildlife habitat types present. Mixed hardwoods are found in the ravines and river lowlands of the Tunica Hills (Delcourt and Delcourt, 1974). Habitat types found in the Mississippi River floodplain include bottomland hardwoods (Palustrine forested wetlands; Cowardin et al., 1979), pastures, cropland, large open water areas such as Sugar and Killarney Lakes (Lacustrine limnetic, Lacustrine littoral; Cowardin et al., 1979), and smaller open water areas such as Charity Lake, small ponds, and borrow pits (Palustrine open water). The mixed hardwoods of the Tunica Hills are vegetated with Carolina beech, white ash, southern magnolia, white oak and Shumard oak. The herbaceous understory consists primarily of phlox, may apple, Christmas fern, and bellwort (Allen et al., 1975).

The bottomland hardwoods are mainly located outside the ML. Overstory vegetation includes hackberry, eastern cottonwood, box elder, green ash, bitter pecan, honeylocust, waterlocust, baldcypress, and water oak. Typical understory plants include swamp privet, greenbriars, rattan vine, hawthorne, butterweed, and Cyperus spp.

Agricultural land (pasture and cropland) comprises the most extensive habitat type in the LSP. Principal crops include soybeans, cotton, sorghum, corn, and various truck crops. Cattle graze on the pasturelands.

The largest open water area is the 430-acre Lake Killarney, located within the ML. Other open waters include Sugar and Charity Lakes, borrow pits, and small ponds. Aquatic vegetation such as floating water primrose and duckweed are common in these waters. Swamp privet is commonly found in association with the borrow areas.

Fishery Resources

The fishery resources of the study area are limited to Lake Killarney, Sugar Lake, Charity Lake, and several borrow pits and small ponds. Fishes expected to occur in the 430-acre Lake Killarney include largemouth bass, black crappie, white crappie, warmouth, bluegill, channel catfish, yellow bullhead, bowfin, spotted gar, carp, gizzard shad, pirate perch, mosquito-fish, and several minnow species. Sport fishing is allowed, with employees of the LSP being the major participants.

Sugar Lake comprises approximately 100 acres, and is connected to the Mississippi River via Sugar Lake Bayou. During high water periods this area provides feeding, spawning, and nursery habitat to numerous species of fish common to the Mississippi River. Species known to commonly occur in the river and expected to occur in Sugar Lake include largemouth bass, black crappie, white crappie, spotted gar, longnose gar, shortnose gar, skipjack herring, gizzard shad, threadfin shad, carp, river carpsucker,

smallmouth buffalo, bigmouth buffalo, blue catfish, channel catfish, flat-head catfish, and freshwater drum.

Charity Lake and the borrow pits and sloughs of the study area provide limited fish habitat. These water bodies experience drastic water fluctuations in response to varying climatic conditions and river stages, and experience chronic high turbidity levels. Small populations of yellow bullhead, black bullhead, carp, bowfin, shortnose gar, green sunfish, and mosquitofish are expected to occur in these waters.

Agricultural lands are generally of less value to wildlife than areas supporting native vegetation. However, significant use by some wildlife species occurs. Mourning doves are favored by extensive farming operations where large acreages of soybeans and grain crops are harvested mechanically. Nearby water and suitable nesting habitat make this part of the study area ideal for doves. This area also supplies limited feeding habitat for American woodcock. Eastern cottontail, numerous rodents, cattle egret, bobwhite, eastern meadowlark, and northern shrike utilize agricultural lands throughout the year.

Game mammals associated with bottomland hardwoods include white-tailed deer, swamp rabbit, raccoon, gray squirrel, and fox squirrel. Furbearers present are beaver, mink, gray fox, bobcat, opossum, and possibly nutria. Wood ducks and mallards are expected to utilize the seasonally flooded bottomland hardwoods. Other game birds expected in these wetlands include American woodcock, wild turkey, bobwhite, and mourning dove. Non-game species such as small mammals, raptors, songbirds, reptiles, and amphibians are also believed to be common in this area.

The open water (lakes, borrow pits, sloughs, and ponds) and associated riparian vegetation of the study area support wading birds such as great egret, cattle egret, great blue heron, little blue heron, and green heron. These areas also provide resting habitat to migratory waterfowl such as mallard, northern pintail, green-winged teal, blue-winged teal, gadwall, American wigeon, and lesser scaup. The American alligator occurs in open waters and associated riparian areas of the study area. This species is presently classified by the Department of the Interior as threatened by similarity of appearance in the area. The red-cockaded woodpecker, usually found in mature, open pine forests, may occur in a portion of the study area.

FISH AND WILDLIFE RESOURCES WITH THE PROJECT

Fishery Resources

Approximately 345 acres of cropland and pasture will be converted to borrow pits with the tentatively selected plan. With proper design and stocking, it is possible that the borrow pits would support significant populations of fishes such as largemouth bass, bluegill, and channel catfish. This would depend on maintenance of adequate water levels during periods of

low rainfall and low river stages. However, the potential use of these areas for sportfishing would have to be evaluated prior to a decision to stock these areas for that purpose.

The conversion of 345 acres of open agricultural land to borrow areas will reduce habitat for species such as mourning dove, eastern cottontail, and eastern meadowlark. If cattle grazing along the edges of the borrow pits is not excessive, riparian vegetation may become established in these areas. Such establishment would enhance the value of the borrow pits for numerous wildlife species. Waterfowl that may be expected to utilize the borrow areas include resident wood ducks and wintering mallards, blue-winged teal, green-winged teal, gadwall, American wigeon, and lesser scaup. Wading birds such as green heron, great blue heron, little blue heron, cattle egret, and great egret are expected to utilize the riparian and shoreline areas of the borrow pits for feeding purposes. If significant riparian vegetation develops along the borrow areas, common fur animals that would probably be present include mink, nutria, raccoon, and beaver. Numerous amphibians and reptiles could be expected to utilize the edges of the borrow pits. Representative species would include bullfrog, red-eared turtle, diamond-backed water snake, and western cottonmouth. It is possible that American alligators would also inhabit the borrow pits.

The construction of access roads necessary for levee enlargement would, according to the Draft Main Report, impact approximately 5 acres of bottomland hardwoods, and 1 acre of borrow pits and associated riparian vegetation. This would result in relatively minor impacts to the species found in those habitat types.

DISCUSSION AND RECOMMENDATIONS

It is apparent that efforts have been made to develop a plan that minimizes impacts on high quality fish and wildlife habitat. Should the plan tentatively recommended be authorized for implementation, the design of the borrow pits could be refined to optimize fish and wildlife productivity. Such design might include measures such as fencing to exclude cattle grazing so that establishment of riparian vegetation is enhanced, sloping of the borrow pit edges to encourage establishment of riparian and aquatic vegetation, and similar features. In addition, the desirability of stocking fish in selected borrow areas could also be determined in concert with officials of the LSP and appropriate fish and wildlife agency representatives.

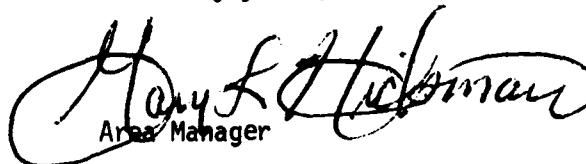
In view of the above considerations, the Fish and Wildlife Service recommends that:

1. Plan A1 be the plan recommended for authorization; and
2. The Fish and Wildlife Service be provided the opportunity for timely input into detailed project design, should project authorization be granted.

A review draft of this report was provided to the Louisiana Department of Wildlife and Fisheries and the National Marine Fisheries Service. Copies of letters of comment received are attached.

Your cooperation in this matter is appreciated..

Sincerely yours,


Area Manager

Attachment

LITERATURE CITED

- Allen, C. M., M. G. Curry, and B. F. Martin. 1975. A vascular flora of St. Helena and West Feliciana Parishes, Louisiana. University of Southwestern Louisiana, Office of Institutional Research. Research Series No. 39. 80pp.
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- Delcourt, H. R. and P. A. Delcourt. 1974. Primeval magnolia-holly-beech climax in Louisiana. Ecology 55:638-644.

State of Louisiana



JESSE J. GUIDRY
SECRETARY

DEPARTMENT OF WILDLIFE AND FISHERIES
400 ROYAL STREET
NEW ORLEANS 70130
504/342-5864

DAVID C. TREEN
GOVERNOR

October 30, 1981

Mr. Dave Fruge'
U.S. Fish and Wildlife Service
P.O. Box 4305
Lafayette, La. 70502

RE: Louisiana State Penitentiary Levee,
Mississippi River, Coordination Act Report

Dear Mr. Fruge':

We have reviewed the above referenced document and we concur with your assessment and recommendations. We have also informed the Corps that we favor implementation of Plan A1.

Sincerely,

Jesse J. Guidry
Jesse J. Guidry
Secretary

JJG:MBW:cgd



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Environmental Assessment Branch
4700 Avenue U
Galveston, TX 77550

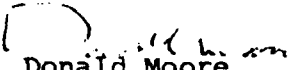
November 6, 1981 F/SER612/PK
713/766-3699

Mr. David Fruge
Acting Field Supervisor
U.S. Fish & Wildlife Service
Division of Ecological Svcs.
Post Office Box 4305
Lafayette, LA 70501

Dear Mr. Fruge:

We have reviewed the preliminary draft of the proposed Fish and Wildlife Service report on the study, "Louisiana State Penitentiary Levee, Mississippi River." Since we anticipate that any adverse effects that might occur on marine and anadromous fishery resources would be minimal, we therefore, have no suggestions to offer on the report.

Sincerely,


Donald Moore
Area Supervisor



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SECTION III

Cultural Resources

CULTURAL RESOURCES

Very little is known about prehistoric use of the flood plain at this location. Site 16WF3, Angola Gate Mound, is tentatively identified as a Poverty Point site, but has not been tested. During the historic period the site was used as a cemetery. Site 16WF21, located on the rolling terrace east of Davis Bayou, may be the only other prehistoric site now recorded within project boundaries. Sequential reconstruction of the present drainage system would be a helpful tool in predicting the probability of finding prehistoric flood plain sites.

A great deal more is known about the protohistoric period. Ethnographic sources indicate that the area was occupied by a series of aboriginal groups. DeSoto's expedition of 1541-1542 was the first European force to visit the vicinity. DeSoto was reportedly buried in the Mississippi River near its confluence with the Red. French explorers and missionaries frequented the area from the mid to late 17th century. Indian groups actively participated in the European conflict for control of the river.

References to the project area appear in the journals of such explorers as LaSalle and Tonti as early as 1682. In 1699, Pierre LeMoyne, Sieur d'Iberville, visited Houma Indians who were settled on the bluff above the project area. Iberville erected a large cross near the relict channel presently known as Lake Killarney. Through time the lake has been called Lake of the Tunica, Lake of the Cross, and Lake Angola. The land below the bluffs was known throughout the 18th century as the Portage of the Cross.

In 1700 a French Jesuit, Father Paul du Rhu, built a chapel in the vicinity of Tunica, Louisiana. Father du Rhu was followed by Father de Limoges who established a mission for the purpose of converting and trading with the Houma Indians. According to site files located in the state Archeologist's Office, the first Catholic Church site in the lower Mississippi River Valley is located on the bluff near Lake Killarney.

During this same period aboriginal groups allied with English and French forces and actively fought other aboriginal groups of opposite allegiance. The Tunica, allies of the French, were driven from their settlements on the Yazoo River by the Chickasaw. In 1706, they moved to the project area and eventually killed or drove off the Houma. The Tunica controlled the access to the Red River and the trade of salt and horses. The Tunica quickly abandoned the bluff settlements of the Houma and founded at least two flood plain villages (within project boundaries) at either end of the Portage of the Cross. Site 16WF2, the Angola Farm site, has been identified as the northernmost village of this pair. Site 16WF1, the Tunica Village site, which is located beneath Highway 66 just south of the Penitentiary main gate, may be the southernmost village of this pair. Following a skirmish in 1731 at Angola farm with visiting Natchez warriors (English allies), the Tunica moved south to Trudeau Landing to be closer to French forces. Trudeau Landing (16FW25) is the only site in the project vicinity which is listed on the National Register of Historic Places. It is east of the community of Tunica, Louisiana, and outside the project area. Between 1784 and 1803, the Tunica purchased land from the Avoyel and moved to a permanent home at Marksville, Louisiana.

The 19th century is memorable for the marked increase in Man's effort to change his environment. In 1831, Captain Henry M. Shreve engineered the dredging of a shortcut channel along the northern edge of the project area. A similar cutoff was made in 1848 by Raccourci along the southern edge of the project area, forming Raccourci Island. What was once a double meander loop was simplified to a large bend, eliminating miles of navigation channel. An inventory of 19th century wrecks in this reach of channel between miles 311.9 and 299.4 includes 13 wrecks between the years 1830 and 1868. The inventory is published in Appendix AB, Volume II of the Environmental Assessment of the Mississippi River, Cairo, Illinois to Venice, Louisiana (1973). During the Civil War the area was the site of several small skirmishes between Union and Confederate forces. In March 1864, a Union fleet assembled downstream in preparation for the conquest of the Red River. On the Mississippi River Commission hydrologic survey maps of 1879, the project area is identified as Angola Plantation. The State of Louisiana

purchased the property in 1890 and developed the existing penal institution to replace an older facility in Baton Rouge.

To date, there has been no systematic survey of the flood plain or bluffs immediately east of the project boundaries. Investigations have been conducted at several sites. James A. Ford excavated portions of sites 16WF1 (Tunica Village site), 16WF2 (Angola Farm site), 16WF3 (Angola Gate Mound) between 1934 and 1937. William Haag returned to 16WF3 in 1970 and investigated 16WF14, a protohistoric midden on the bluff east of Lake Killarney, in 1964. Jeffery P. Brain conducted additional excavations at 16WF2 in the 1970's.



APPENDIX E

ECONOMICS

GENERAL

The Louisiana State Penitentiary at Angola is located on the left descending bank of the Mississippi River between miles 310 and 294 in the northwest corner of West Feliciana Parish. It incloses an area of 19,428 acres of which 3,187 acres are on high ground located in the Tunica Hills and are not susceptible to flooding. The study area comprises the remaining 16,241 acres which are low-lying, relatively flat Mississippi River alluvial lands, generally situated between 40 and 55 feet National Geodetic Vertical Datum (NGVD).¹ About 9,866 acres of this total are inclosed by a 12.1-mile primary mainline loop levee which abuts the Tunica Hills at both ends and provides protection from Mississippi River headwater flooding for the prison population and their extensive appurtenant supportive facilities. Of the remaining prison lands, 1,416 acres are located in the southwestern portion of the property and are known as the Charity Lake area, and 858 acres are located in the northwestern corner and are known as the Monkey Island area; both these areas are provided some protection by existing small-scale agricultural levees. In addition, 4,101 unprotected acres are located outside of the levee system.

The levees protecting Angola are owned by the Department of Corrections of the Louisiana State Department of Health and Human Resources and were originally constructed with inmate labor; consequently, the present

¹All elevations and stages in this report are in feet National Geodetic Vertical Datum (previously mean sea level) unless otherwise noted.

Angola levee system, which is substandard with regards to Federal specifications, is one of the few mainline systems in the Lower Mississippi Valley which is not under Federal control and supervision. The Louisiana Department of Transportation and Development's Office of Public Works, which is responsible for state flood control interests, does not have the resources to improve the system, and wants the Federal Government to modify the existing system to meet Federal specifications and incorporate it into the Mississippi River and Tributaries (MR&T) project. During the high water period in the spring of 1973, an emergency situation developed which confirmed the substandard levee conditions at Angola. The National Guard was mobilized for the flood-fight and emergency repairs and improvements were required to insure adequate protection. During this emergency, the state was forced to make plans in preparation for evacuation of the entire prison population in case a levee failure occurred. Although the mainline levee did not crevasse, high waters flooded the Monkey Island area, and also would have inundated the Charity Lake area had a massive sandbagging flood-fight effort not been mounted. Altogether, over \$240,000² were expended for flood-fight.

In 1975, high water on the Mississippi again threatened Angola. Although of lesser magnitude than 1973, the floodwaters covered an estimated 80 percent of the Charity Lake and Monkey Island areas. No losses were suffered within the main compound, but a flood-fight effort that cost \$73,000 was required. In April 1979, high water of a 16-year annual exceedence interval again created havoc requiring extensive flood-fighting efforts.

²All prices are as of October 1980 price levels.

PRESENT AND FUTURE DEVELOPMENT

In recent years, prisons throughout the country have come under court orders to modernize their penal facilities in order to provide a better environment for their charges. In 1974, Louisiana was ordered by a Federal circuit court to reduce its prison population at Angola and to greatly improve the penal facilities there. The state agreed to comply with this mandate and has embarked upon a large scale construction and refurbishing program which has added significantly to the value of improvements at Angola. It would be imprudent to locate such a massive complex and its prison population within the immediate flood plain of the Mississippi River without providing the facilities with a high level of protection. In addition to the risks to life, the immense logistical problems involved in trying to evacuate thousands of prisoners to safer areas in the event of future flood threats are great. The degree of flood protection for Angola also involves nonquantifiable, but important social implications. If it becomes necessary to evacuate the prison population, there is the danger of hardened criminals escaping due to the lack of maximum security facilities elsewhere in the state. Also, public sentiment is strongly against the relocating of criminal elements, even for short periods.

VALUE OF IMPROVEMENTS

A tabulation of existing and planned improvements at Angola, all of which are, or will be, located within the area protected by the mainline levee, is shown in table E-1.

PRISON POPULATION

The present inmate population of Angola is 4,200, and is projected to increase to 4,500 as soon as ongoing renovation work is completed, and then to remain stable at that number in the foreseeable future.

TABLE E-1--VALUE OF IMPROVEMENTS

<u>Structures and Contents</u>	<u>Value (1980 price levels)</u>
Existing as of Oct 76:	\$ 46,757,000
Completed from Oct 76 - Jul 80:	
Mess Hall	4,080,000
Electric System	3,360,000
New Dorms	28,800,000
Pumps	660,000
Remodeling and renovation	30,000,000
Support facilities for dorms	5,760,000
Bachelor officers' quarters	5,400,000
Mobile homes	660,000
Training academy	1,800,000
200 new cell blocks	5,400,000
New vocational school	<u>2,760,000</u>
Subtotal	\$88,680,000
Ongoing work:	
Renovation of employee housing	600,000
New employee homes	1,080,000
100 apartment units	<u>4,560,000</u>
Subtotal	\$6,240,000
TOTAL	\$141,677,000

The current employee complement at the Angola complex is about 1,700. Of these, approximately 600 live within the compound, while the balance commute from outlying communities. Additionally, there are over 300 employee dependents living within the prison compound.

ALTERNATIVE SOLUTIONS

PRELIMINARY ALTERNATIVES

Seven structural alternative plans were considered in the preliminary analyses for improvement of the levee system at Angola. Six of these plans considered various combinations of protecting the Monkey Island and Charity Lake areas outside of the mainline levee. These six plans were found to be economically unjustified in the preliminary analyses. The remaining structural alternative (plan A) consisted of raising and strengthening the mainline levee only, and is the plan that has been carried forward to the detailed analyses. Table E-2 presents a summary for each alternative plan considered in preliminary planning.

Plan A (national economic development plan) would raise and strengthen the mainline levee to a maximum height of 71.5 feet NGVD by levee enlargement with seepage berms.

Plan B would provide design protection to both the mainline and Monkey Island areas.

Plan C would provide design protection to both the mainline levee and Charity Lake levee areas.

Plan D would provide design protection for the Monkey Island levee, mainline levee, and Charity Lake levee areas.

Plan E would be identical to plan A except that in addition the Monkey Island levee would be raised and strengthened to protect against the 10-year flood.

TABLE E-2--SUMMARY - PRELIMINARY ALTERNATIVES

	Plan A	Plan B	Plan C	Plan D	Plan E	Plan F	Plan G
Total First Cost	\$17,938,000	\$28,052,000	\$25,265,000	\$35,291,000	\$27,004,000	\$22,157,000	\$31,272,000
Present Value of Investments ¹	19,971,000	31,231,000	28,128,000	39,292,000	30,065,000	24,667,000	34,816,000
Interest and Amortization	1,474,000	2,305,000	2,076,000	2,908,000	2,219,000	1,821,000	2,570,000
Operation, Maintenance, and Replacement	14,000	27,000	32,000	47,000	29,000	32,000	50,000
Total Annual Charges	1,488,000	2,332,000	2,108,000	2,947,000	2,248,000	1,853,000	2,620,000
Total Annual Benefits	2,089,000	2,171,000	2,190,000	2,272,000	2,162,000	2,179,000	2,252,000
Net Benefits	601,000	-161,000	82,000	-675,000	-86,000	326,000	-368,000
Benefit-Cost Ratio	1.40	0.93	1.04	0.77	0.96	1.18	0.86
Incremental Benefit-Cost ² Ratio	-	0.10	0.16	0.13	0.10	0.25	0.14

¹Construction is estimated to start in 1987 and to be completed in 2 years. Significant benefits are estimated to start accruing in 1989 (project base year).

²Incremental benefit-cost ratio = $\frac{\text{Benefits Plan "X" - Plan A}}{\text{Costs Plan "X" - Plan A}}$

Plan F would be identical to plan A except that in addition the Charity Lake levee would be raised and strengthened to protect against the 10-year flood.

Plan G would be identical to plan A except that in addition both the Monkey Island levee and Charity Lake levee would be strengthened to protect against the 10-year flood.

DETAILED ALTERNATIVES

In addition to the structural plans considered in preliminary planning, numerous nonstructural options were also evaluated but were found to be impractical. However, all nonstructural options and also the no action plan were again evaluated in stage 3 studies. In addition, a least environmentally damaging plan was formulated, and is the recommended plan. Table E-3 shows the first costs and annual charges.

BENEFITS

METHODOLOGY

It has been assumed that the integrity of the existing mainline levee system at Angola can be maintained with a concerted flood-fight effort until it is overtopped at 61 feet NGVD (excluding 2 feet of freeboard). Once this occurs, the protected area would rapidly fill to that elevation, inundating all improvements within the levee. The design flood frequency of the existing mainline levee (61 feet) has a recurrence interval of once in 30 years which is approximately three times during the 100-year life of the project. It was assumed that subsequent to each crevasse, the levee would be rebuilt to the same configuration as before the crevasse.

All benefits presented herein are based on 1980 price levels and the current interest rate of $7 \frac{3}{8}$ percent assuming a project life of 100 years. Benefits are discussed in the following paragraphs.

TABLE E-3--FIRST COSTS AND ANNUAL CHARGES
(1980 Price Levels)

	<u>Plan A</u>	<u>Plan A1</u> <u>(Recommended Plan)</u>
<u>Summary of Project Costs</u>		
Project First Costs	\$17,938,000	\$18,274,000
Present Value of Construction ¹	19,971,000	20,345,000
Total Investment	19,971,000	20,345,000
<u>Annual Economic Costs</u>		
Interest (7 3/8 percent)	1,473,000	1,500,000
Amortization (100 years)	1,000	1,000
Operation, Maintenance, and Replacement	14,000	14,000
Total Average Annual Charges	1,488,000	1,515,000

¹Construction is estimated to start in 1987 and to be completed in 2 years. Significant benefits are estimated to start accruing in 1989 (project base year).

FLOOD CONTROL BENEFITS

Flood damages which will be prevented with the project in place, or savings in costs which result from the increased protection, include: damages prevented to structures, damages prevented to agriculture, savings in emergency evacuation and subsistence costs, and savings in emergency flood-fight costs.

DAMAGES PREVENTED TO STRUCTURES

The existing prison improvements and the ongoing construction projects within the mainline levee were determined, tabulated, and categorized from field surveys and from interviews with prison officials.

In this analysis, the contents/structural value ratio was determined in the following manner.

A schedule of property values was secured from the Property Insurance Section of the Louisiana State Division of Administration which displayed building and contents values of many structures at the Louisiana State Penitentiary at Angola.

A field trip was made during 1979 to determine actual contents, the types of building construction, and intrastructural (electrical, natural gas, sewer, and water facilities) damage susceptibility.

The contents values, as shown on the state's schedule of property values, were supplemented to conform with the actual field observations and to take into account the privately-owned contents of the homes of the prison employees which do not appear on the schedule of property values.

Weighted averages of the samples were used to construct estimated structure-contents relationships for the major classes of facilities at the prison. This estimate is shown in table E-4.

TABLE E-4--ESTIMATED STRUCTURE - CONTENTS VALUE

	<u>Administrative- Industrial</u> ($\$$)	<u>Staff Residences</u> ($\$$)	<u>Inmate Residences</u> ($\$$)
Structures	49,514,000	5,400,000	68,482,000
Contents	16,340,000(33%)	2,160,000(40%)	3,424,000(5%)

In order to derive depth-damage relationships for the prison improvements, the structures were categorized into three major groups: administrative and industrial facilities, inmate residences, and staff residences (see plate 2). A cross-section of contents of the administrative and industrial buildings was analyzed for damage susceptibility by a board consisting of New Orleans District experts to derive a percent contents damage for those types of structures. For the inmate residences, a percent contents damage was derived with the help of field trips and from interviews with prison officials, whereas for the staff residences, available residential stage-damage data were used.

In calculating the estimated nonagricultural flood damages to the prison (structural and contents losses), the scenario assumed that a breach in the mainline levee at 61 feet which would quickly fill the area inside the levee to that elevation. This would have a recurrence interval of once in 30 years or approximately three times during the project life.

Nearly all the buildings at Angola are one-story cinderblock and concrete construction and, consequently, should not suffer major structural damage if flooded. The most significant damage would be the need for cleanup, repainting, and replacement and/or repair of the electrical and plumbing facilities. Based on district experience in roughly similar circumstances, it was estimated that, in the aftermath of severe flooding, nearly all the buildings could be restored at a cost of 33 percent of their present replacement values.

The road system at Angola consists of 27 miles of bituminous paved roads and 73 miles of gravel farm roads that have a total value of \$5,400,000. It was estimated that with a breach in the levee, the paved and gravel roads would suffer damages for a total repair cost of \$625,000.

There are few contents of value in the large dormitory buildings (metal beds and mattresses) and only the mattresses would be damaged significantly. However, in the kitchen, dining, and cold-storage areas, there are many compressors and cooking facilities which would be heavily damaged. The large industrial-type facilities (tag plant, cannery, Vo-tec school, abattoir, etc.), also contain equipment which is highly susceptible to water damage. Overall, the heaviest damage to be sustained would be to the electrical components: compressors, large ground-mounted transformers and air conditioning units, and the other infrastructural systems (natural gas lines and components, water treatment plants and pumps, and all other motor and motor-driven components).

A summary of damages resulting from a one-time flood occurrence is shown in table E-5. These losses would be prevented by installation of the project.

TABLE E-5--SUMMARY OF DAMAGES
(One Occurrence)

	<u>Adminis- trative & Industrial</u> (%)	<u>Staff Residences</u> (%)	<u>Inmate Residences</u> (%)	<u>Roads</u> (%)	<u>Total</u> (%)
Structural	16,339,000	2,160,000	22,598,000	600,000	41,697,000
Contents	8,006,000	1,944,000	840,000	N/A	10,790,000
Total	24,345,000	4,104,000	23,438,000	600,000	52,487,000
Miscellaneous (5 percent) ¹					2,624,000
					55,111,000

Using a probability analysis, the average annual loss equals approximately \$1,819,000.

¹Includes damages to levees, on-farm drainage facilities, and miscellaneous farm machinery losses.

DAMAGES PREVENTED TO AGRICULTURE

The National Environmental Policy Act establishes as a Federal policy the preservation of highly productive agricultural lands, known as prime and unique farmlands. The agricultural lands of the state penitentiary contain rich alluvial soils which fall into both categories. The existing prison population, facilities, and agricultural land use are anticipated to remain stable in the future with or without the project; however, the productivity of these prime and unique lands will be enhanced as described in the following sections. The current agricultural land use within the mainline levee consists of 4,850 acres in pasture, 3,500 acres in soybeans, 540 acres in cotton, and 350 acres in corn. A small number of acres are used for growing vegetables which are consumed within the prison. A levee crevasse with complete inundation of these agricultural lands at any time during the spring, with the resulting siltation and erosion problems and higher priority flood recovery efforts, will cause a total loss of net returns to agriculture for at least that year. Based on land use data for without-project conditions contained in table E-6, average annual agricultural damages would be \$28,000. For with project conditions, these losses would be negligible.

During the formulation of preliminary plans, agricultural intensification benefits were calculated on some 1,500 acres of soybeans located in the northern portion of the prison compound that are somewhat lower in elevation than the rest of the compound and often susceptible to interior drainage problems resulting in reduced yields and increased production costs. It was assumed that these drainage problems were primarily the result of a combination of seepage through the mainline levee and inadequate interior pumping capacity. Total intensification benefits to increased soybean production of \$155,000 were then calculated using a five bushel/acre increase in yield potential with project, assuming the seepage berms would alleviate the problem. Subsequently, in the formulation of detailed plans, the problem was determined to be primarily one of inadequate interior drainage at times of intense rainfall runoff from the Tunica Hills. An incremental benefit/cost analysis was then performed to

TABLE E-6--LAND USE DATA WITHIN MAINLINE LEVEE

Land ¹ Use	Acres	Yield/ Acre	Produce	Without Project				Variable Cost/ Unit	Cost Amount	Total Cost	Net Return
				Current Norm Price ²	Gross Value	Fixed Cost/ Acre	Cost Amount				
Cotton	540	775 lb.	418,500	0.599	250,682	107.85	58,239	0.11	46,035	104,274	146,408
Corn	350	50 bu.	17,500	2.48	43,400	56.84	19,894	0.47	8,225	28,119	15,281
Soybeans	3,000	33 bu.	99,000	6.35	628,650	47.28	141,840	0.47	46,530	188,370	440,280
Soybeans	500	28 bu.	14,000	6.35	88,900	47.28	23,640	0.47	6,580	30,220	58,680
Pasture	4,850	2 cwt.	9,700	52.53	509,541	17.15	83,178	23.54	228,338	311,516	198,025
Total	9,240				1,521,173		326,791		335,708	662,499	858,674 (859,000)

¹Source: Officials at Angola

²Source: Agricultural Price Standards - US Water Resources Council - October 1980

see if the cost of additional pumping capacity and appurtenant drainage laterals could be offset by the possible agricultural intensification that could result and was found to be unjustified. The intensification benefits have, therefore, been eliminated from the stage 3 report.

SAVINGS IN INMATE EVACUATION AND SUBSISTENCE COSTS

The Mississippi River crested at 58.2 feet in the vicinity of Angola during the flooding of 1973 and again at 59.2 feet in the spring of 1979. Although no inmates were evacuated, serious consideration was given to that possibility. Had a mainline levee crevasse or overtopping appeared imminent, the entire prison convict population would have been moved to parish prisons throughout the state. According to Angola officials, there is no set flood stage at which inmate evacuation would be ordered, but contingency plans call for constant monitoring of the levee system during high water stages. Given the extreme logistical and security requirements of evacuating such a large number of inmates, an order for complete evacuation of the inmate population in all probability would be given with a river stage in the vicinity of 60 feet and rising. Such a flood is likely to happen every 20 years of project life, on the average. These emergency situations, which would result in only short term evacuation, are in addition to the expected levee crevasses which would require those costs associated with the long term extraordinary maintenance and subsistence requirements (an estimated 4 months) that would be incurred while the existing compound is being rehabilitated.

The 1980 inmate population is 4,200 and is projected to increase to 4,500 shortly and then to remain stable in future years. The cost of evacuation with no crevasse is \$1,250,000 while evacuation and subsistence cost with a crevasse is \$4,600,000. Estimated costs were furnished by prison officials. Annualized savings in inmate evacuation costs over the project life total \$214,000, including \$62,000 for short term evacuations and \$152,000 for the crevasses.

SAVINGS IN EMERGENCY FLOOD-FIGHT COSTS

The cost expended in 1975 for the flood-fight effort that year was about \$73,000 and was associated with 9-year frequency high water levels. In 1973, flood-fight costs were \$240,000 for a 13-year flood. However, in 1974, the flood-fight costs for a 5-year flood was nominal. Therefore, it is reasonable to expect that flood-fight efforts will begin at Mississippi River levels somewhat below those experienced in 1975, or about 56 feet, which occurs about once every 8 years. In order to determine flood-fights costs saved, a relationship was developed between stage and flood-fight costs, resulting in average annual benefits of \$25,000.

SAVINGS IN LEVEE REPAIR COSTS

Subsequent to each crevasse there will be costs associated with rebuilding the levee to pre-crevasse conditions. The costs have been determined to be \$83,000 per crevasse. Using a probability analysis, the average annual savings in these repair costs is \$3,000.

BENEFITS SUMMARY

A summary of benefits attributable to each alternative plan is displayed in table E-7. Benefit-to-cost ratios are shown in table E-8. An updated benefits summary for the recommended plan using 1981 price levels and the current interest rate (7 5/8 percent) is presented in table E-9.

TABLE E-7--BENEFITS SUMMARY
(October 1981 price levels; 7 3/8 percent interest rate)

<u>Benefit Category</u>	<u>Plan A</u> (<u>\$</u>)	<u>Plan A1</u> (<u>\$</u>)
Damages prevented to structures	1,819,000	1,819,000
Savings in inmate evacuation costs	214,000	214,000
Damages prevented to agriculture	28,000	28,000
Savings in flood-fight costs	25,000	25,000
Savings in levee repair costs	<u>3,000</u>	<u>3,000</u>
Total Benefits	2,089,000	2,089,000

TABLE E-8--BENEFIT-COST RATIOS

	<u>Plan A</u> (<u>\$</u>)	<u>Plan A1</u> (<u>\$</u>)
Average Annual Benefits	2,089,000	2,089,000
Average Annual Costs	1,488,000	1,515,000
Benefit-Cost Ratios	1.40	1.38

TABLE E-9--UPDATED BENEFITS SUMMARY
(October 1981 price levels, 7 5/8 percent interest rate)

Benefit Category	Recommended Plan Plan A1 (\$)
Damages prevented to structures	2,001,000
Savings in inmate evacuation costs	235,000
Damages prevented to agriculture	31,000
Savings in flood-fight costs	28,000
Savings in levee repair costs	<u>3,000</u>
Total Average Annual Benefits	2,298,000
Average Annual Costs	1,814,000
Benefit-Cost Ratio	1.27

APPENDIX F
PUBLIC VIEWS AND RESPONSES

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1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

519



United States
Department of
Agriculture

Soil
Conservation
Service

3737 Government Street
Alexandria, LA 71301

October 22, 1981

Colonel Robert C. Lee
Commander and District Engineer
Corps of Engineers
P. O. Box 60267
New Orleans, LA 70160

Dear Colonel Lee:

Re: LHMFD-RE

We have reviewed the draft Main Report, Environmental Impact Statement, and Technical Appendices of August, 1981, for the Louisiana State Penitentiary Levee, Mississippi River. These reports are well written and present clear descriptions of the alternatives considered. Proposed improvements on the Angola levee will provide additional protection to approximately 9,240 acres of prime and unique farmland. Approximately 300 acres of agricultural lands will be converted to borrow pits.

We appreciate the opportunity to review these draft documents and have no additional comments.

Sincerely,

Alton Mangum
State Conservationist

cc: Norman Berg, Chief, SCS, Washington, D.C.
Thomas Rockenbaugh, Assistant Chief, SW, SCS, Phoenix, Arizona
Billy M. Johnson, Director, STSC, SCS, Fort Worth, TX
Director, Environmental Services, SCS, Washington, D.C.

No response required.



The Soil Conservation Service
is an agency of the
Department of Agriculture

SCS-AS-1
10-79



GENERAL COUNCIL OF THE
UNITED STATES DEPARTMENT OF COMMERCE
Washington, D.C. 20530

2

NOV 10 1981

Colonel Robert C. Lee
New Orleans District, Corps of Engineers
Department of the Army
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Lee:

This is in reference to your draft environmental impact statement entitled, "Louisiana State Penitentiary Levee, Mississippi River." The enclosed comment from the National Oceanic and Atmospheric Administration is forwarded for your consideration.

No response required.

Thank you for giving us an opportunity to provide this comment, which we hope will be of assistance to you. We would appreciate receiving four copies of the final environmental impact statement.

Sincerely,

Robert T. Miki
Robert T. Miki
Director of Regulatory Policy

Enclosure Memo from: Robert B. Rollins
National Ocean Survey
NOAA

2



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, MD 20852

September 24, 1981

3

TO: PP/EC - Joyce M. Mood
FROM: OA/CS - Robert B. Rollins
SUBJECT: DEIS 8109.14 - Louisiana State Penitentiary Levee, Mississippi River

The subject statement has been reviewed within the areas of the National Ocean Survey's (NOS) responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and project:

3.1 Geodetic control survey monuments may be located in the proposed project area. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days' notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for NOS monuments. For further information about these monuments, please contact Mr. John Spencer, Director, National Geodetic Information Center (OA/C18) or Mr. Charles Novak, Chief, Network Maintenance Branch (OA/C172), at 6001 Executive Boulevard, Rockville, Maryland 20852.

Response 3.1—The locations of geodetic control survey monuments will be confirmed in the design phase of the study. National Ocean Survey will be notified at that time and arrangements will be made for relocation.



10TH ANNIVERSARY 1970-1980
National Oceanic and Atmospheric Administration
A young agency with a historic
tradition of service to the Nation

3

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta, Georgia 30333
(404) 262-6649

November 2, 1981

Colonel Robert C. Lee
Commander and District Engineer
Department of the Army
New Orleans District, Corps
of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Lee:

We have reviewed the Draft Environmental Impact Statement (EIS), Main Report, and Appendices for Construction of the proposed flood control project, Louisiana State Penitentiary Levee, Mississippi River. We are responding on behalf of the Public Health Service.

4.1 No mention is made of either existing or potential mosquito or other vector populations that will be impacted by the project. The Final EIS should describe the extent of these vector populations and the beneficial or adverse project effects. There should also be descriptions of who will provide mosquito control activities, the anticipated control measures to be followed, and the proposed application rates and methods of application for any insecticides that may be used.

4.2 If it is anticipated that there will be any vegetation control measures employed during or after project completion, the Final EIS should describe the control measures to be followed, the methods of chemical application, the types of herbicides to be used, and other related aspects of the control program.

Thank you for the opportunity of reviewing the Draft EIS. We would appreciate receiving a copy of the Final EIS when it is issued.

Sincerely yours,

Frank S. Lianila
Frank S. Lianila, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Center for Environmental Health

Response 4.1--Information on vector populations and project effects was added on pages EIS-18 and EIS-26. Vector control will be addressed in the advanced engineering and design report indicating the responsibility and methods by which vector problems will be minimized during construction activities.

Response 4.2--It is not anticipated that there will be any chemical vegetation control measures employed during or after project completion.



REGION VI

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FORT WORTH REGIONAL OFFICE
201 WEST LANCASTER AVENUE
P.O. BOX 2808
FORT WORTH, TEXAS 76112

5

IN REPLY REFER TO:

October 29, 1981

Colonel Robert C. Lee
District Engineer
New Orleans District
Corps of Engineers, U.S. Army
P.O. Box 60267
New Orleans, Louisiana 70160

No response required.

Dear Colonel Sands:

The Draft Environmental Impact Statement Main Report and Appendices for Louisiana State Penitentiary Levee, Mississippi River has been reviewed in the Department of Housing and Urban Development's New Orleans Area Office and Fort Worth Regional Office, and it has been determined that the concerns of the Department have been disclosed adequately without adverse impact or involvement.

Sincerely,

W. J. Hancock
Walter J. Hancock
Environmental Clearance Officer

5

AREA OFFICES
DALLAS, TEXAS - LITTLE ROCK, ARKANSAS - NEW ORLEANS, LOUISIANA - OKLAHOMA CITY, OKLAHOMA - SAN ANTONIO, TEXAS



United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Project Review
Post Office Box 3088
ALBUQUERQUE, NEW MEXICO 87103

6

ER-81/1869

NO. 06 1981

District Engineer
New Orleans District,
Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Sir:

We have reviewed the draft environmental statement, Main Report, and Appendices for Louisiana State Penitentiary Levee, Mississippi River, West Feliciana Parish, Louisiana, and have the following comments.

6.1 The proposed intensive cultural resources survey referred to on page 28 should include the disciplines of archeology, architecture, and history with competent professionals in each field. Also, the Corps of Engineers must request determinations of eligibility for the National Register on each of the sites and structures identified in the survey. We would welcome the opportunity to comment on the report when it is completed.

Thank you for the opportunity to comment on these documents.

Sincerely,

Raymond P. Churan

Raymond P. Churan
Regional Environmental Officer

Response 6.1—The Corps will conduct an intensive survey utilizing professionals of all appropriate disciplines. The report of these investigations will be coordinated with the Louisiana State Historic Preservation Officer (SHPO), whose opinion regarding site significance will be requested. In accordance with 36CFR800.4 (Advisory Council of Historic Preservation: Protection of Historic and Cultural Properties) formal requests for determinations of eligibility to the National Register of Historic Places will be made only for those sites which either the Corps or the SHPO find meet National Register criteria (36CFR800.4, dated 16 Nov 81).



STANDARD

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
P. O. BUILDING
WASHINGTON, D. C. 20590
September 16, 1981

7

IN REPLY, REFER TO

Louisiana State Perpetuity Levee,
Mississippi River Draft Report, H16,
and Technical Appendices
LH870-82

Colonel Robert C. Lee, CE
Commander and District Engineer
New Orleans District
Corps of Engineers
P. O. Box 60247
New Orleans, Louisiana 70166

No response required.

Dear Colonel Lee:

We have no comments on the subject document. Thank you for the
opportunity to comment.

Sincerely yours,

J. H. McDonald
J. H. McDonald
Division Administrator



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

October 8, 1981

Colonel Robert C. Lee
Commander & District Engineer
New Orleans District
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Lee:

We have completed our review of the Draft Environmental Impact Statement (EIS), Main Report, and Appendices for the construction of proposed flood control improvements for the existing Angola State Penitentiary Levee, West Feliciana Parish, Louisiana. The proposed plan of action consists of raising and strengthening the mainline levee from 63.0 feet to 71.5 feet National Geodetic Vertical Datum (NGVD) to establish flood protection for the Standard Project Flood. The present levee system is substandard and deficient in both grade and cross section.

No response required.

We classify your Draft EIS as LO-1. Specifically, we have no objections to the proposed project plan as it relates to the Environmental Protection Agency's (EPA) legislative mandates. The EIS contained sufficient information to evaluate adequately the possible environmental impacts which could result from project implementation. Our classification will be published in the Federal Register in accordance with our responsibilities to inform the public of our views on proposed Federal actions under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the enclosure. Our procedure is to categorize the EIS on both the environmental consequences of the proposed action and on the adequacy of the EIS at the draft stage, whenever possible.

We appreciated the opportunity to review the Draft EIS. Please send our office five (5) copies of the Final EIS at the same time it is sent to the Office of Federal Activities, U.S. Environmental Protection Agency, Washington, D.C.

Sincerely yours,

Francis E. Phillips
Francis E. Phillips, P.E.
Regional Administrator

Enclosure

ENVIRONMENTAL IMPACT OF THE ACTION

LO - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER - Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to re-assess these aspects.

EU - Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make a determination.



DAVID C. TREEN
Governor

STATE OF LOUISIANA
DEPARTMENT OF CULTURE, RECREATION AND TOURISM
OFFICE OF PROGRAM DEVELOPMENT

ROBERT B. DUBLEUX
Assistant Secretary

MRS. LAWRENCE H. FOX
Secretary

October 13, 1981

9

Colonel Robert C. Lee
Commander and District Engineer
Department of the Army
New Orleans District, Corps of Engineers
P. O. Box 60267
New Orleans, LA 70160
LAMPD-22

Re: Draft Environmental Impact Statement
Louisiana State Penitentiary Levee
West Feliciana Parish

No response required.

Dear Colonel Lee:

My staff has reviewed the above-referenced document at your request, and we are pleased to note the commitment to undertake an intensive cultural resources survey of the proposed impact zone during advanced feasibility studies. We will be happy to review this report when it becomes available.

If we may be of further assistance, do not hesitate to contact my staff in the Division of Archaeology and Historic Preservation.

Sincerely,

Robert B. Dubleux

Robert B. Dubleux
State Historic Preservation Officer

RBD:PMR:tb

10

DIVISION OF ARCHAEOLOGY AND HISTORIC PRESERVATION
P. O. Box 44247 Baton Rouge, La. 70804 224 342-6882



PAUL J. HARDOY
Secretary
J. F. "APR" HENGE
Assistant Secretary

Department of Transportation and Development

OFFICE OF PUBLIC WORKS

P.O. BOX 44185 CAPITOL STATION
BATON ROUGE, LA. 70804



DAVID C. TREHN
Governor

November 18, 1981

10

Colonel Robert C. Lee
Commander and District Engineer
U. S. Army, Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Lee:

This office is in receipt of your letter of September 8, 1981 transmitting a copy of the Draft Environmental Statement, Main Report and Appendices, for the construction of the flood control project, Louisiana State Penitentiary Levee, Mississippi River, and requesting that we review the subject documents and furnish you our comments.

The Office of Public Works staff has reviewed the subject documents and we offer no objections to the Tentatively Selected Plan.

The resolution of the Committee on Public Works of the United States Senate, adopted on September 5, 1973, requested the Department of the Army to determine the advisability of incorporating the Louisiana State Penitentiary Levee into the Mississippi River and Tributaries Project. Since the report concludes that both Plans A and A-1 are implementable and acceptable, we assume that the recommendation of the final report will be that the Louisiana State Penitentiary Levee be incorporated into the Mississippi River and Tributaries Project. Cost sharing, then, should be the same for this segment of levee as for any other segment of mainline levee on the MR & T Project. Local interests' share of the costs should not include any part of the construction cost. This has been the traditional cost sharing policy.

We sincerely appreciate the opportunity to review your report and express our views.

Yours truly,

Arthur R. Theis

Arthur R. Theis
Chief Engineer

ART:CB:jes

Response 10.1—US Army Corps of Engineers policy requires that we recommend cost-sharing in accordance with the President's cost-sharing policy announced 6 June 1978. This policy requires a 5 percent financing contribution from the state and a 20 percent financing from the local sponsor. Required lands may be donated for credit. Your objections to this policy will be forwarded with the final report to higher authority.



Jesse J. Guidry
Secretary

DEPARTMENT OF WILDLIFE AND FISHERIES
400 PONTAL STREET
NEW ORLEANS 70130

DAVID C. GREEN
Secretary

October 12, 1981

Colonel Robert C. Lee
New Orleans District
Corps of Engineers
P.O. Box 60267
New Orleans, La. 70160

RE: LMSFD-RE La. State Penitentiary
Levee, Mississippi River

No response required.

Dear Sir:

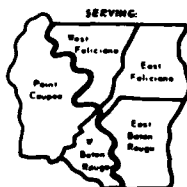
We have reviewed the above referenced draft document and concur in the assessment and recommendation to implement Alternative A-1.

We appreciate the opportunity afforded us to work with your staff on this project and to review the draft document.

Sincerely,

Jesse J. Guidry
Jesse J. Guidry
Secretary

JJC:MMW:cig



Capital-Area Groundwater Conservation Commission

F. O. Box 64526
Baton Rouge, Louisiana 70896
Telephone (504) 924-7490

September 25, 1981

12

Colonel Robert C. Lee, District Engineer
Department of the Army, Corps. of Engineers
New Orleans District
Postoffice Box 60267
New Orleans, Louisiana 70160

RE: EIS, Louisiana State Penitentiary
Levee—Draft, August 1981
LAMPD-EE

No response required.

Dear Colonel Lee:

The referenced EIS has been reviewed and the proposed flood control project should have no adverse effect on the area's ground water resources. Although the borrow pits may cut into the shallow part of the Mississippi alluvial aquifer, the interchange of water into and from the river should have no adverse effect on water quality from existing wells in the alluvial aquifer. Records indicate that all wells in this aquifer are on the west side of the river, thus the long travel time will reduce the possibility of water quality changes. During low flow, it is possible that the discharge toward and into the river may be increased. This will cause some additional lowering of water levels, but only in the immediate vicinity of the excavation.

Thus, we have no objections to the contents of the EIS and to the planned activities.

Very truly yours,

A. M. Turcan, Jr.
A. M. Turcan, Jr.
Director

ANT/obo



DANIEL A. POOLE
President
L. E. JAHN
Vice-President
L. L. WILLIAMSON
Secretary
JACK S. PARKER
Board Chairman

Wildlife Management Institute

709 Waco Building, 1020 Vermont Ave., N.W., Washington, D.C. 20005 • 202 / 347-1774

PLEASE REPLY TO:
Murray T. Walton
Southeastern Representative
Box Route 5A, Box 810
Dripping Springs, Texas 78620
512-852-3473

October 10, 1981

Colonel Robert C. Lee
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Lee:

The Wildlife Management Institute has reviewed the Draft Main Report and Environmental Impact Statement for the Louisiana State Penitentiary Levee, Mississippi River. We are most favorably impressed with the attention and consideration given fish and wildlife resources in this document, particularly in relationship to the project purpose, i.e. provision of flood protection to a highly developed area with rather critical need for such protection.

The Institute notes that the tentatively selected plan, A-1, is also designated the least environmentally damaging of the action alternatives. Page EIS-2 states "...the minor increases in cost associated with plan A-1 would be small when compared to the adverse environmental impacts that would accompany Plan A." Table 4.4 on page EIS-15 indicates that the primary environmental advantage of plan A-1 is impacting 74 acres less of bottomland hardwoods and 9 acres less of wetlands. This is accomplished at an increase in project cost of \$336,000 or about 2% increase in project cost not counting the value of existing right-of-way (The figures for traditional federal cost-sharing appear to be + \$20,000 in error on pp. 28, 41, and EIS-14).

Although the Institute applauds such consideration of fish and wildlife resources and is desirous of such Corps action on other projects, we question if the proposed action is the most cost effective and the relative public benefits since little public use is made of the area. As an alternative, The Institute recommends that the Corps take the \$336,000 which it has stated is a "minor increase in cost" and purchase a larger acreage of bottomland hardwoods in adjacent danger of clearing for agriculture as mitigation. Such land should be adjacent to one of the existing Louisiana Department of Wildlife and Fisheries Wildlife Management Areas and turned over to that agency for management.

Thank you for allowing us to review this document.

Sincerely,
Murray T. Walton
Murray T. Walton
Southeastern Representative

DEDICATED TO WILDLIFE SINCE 1971

Response 13.1—These corrections have been made.

Response 13.2—The least environmentally damaging plan was formulated in accordance with Section 18-2 of the Digest of Water Resources Policies and Authorities (WF 1165-2-1, 27 Mar 81) which reads as follows:

18-2. Mitigation. Damages to fish and wildlife resources will be prevented to the extent practicable through good planning and design. Measures to offset unavoidable damages to fish and wildlife will be included in projects when the cost of measures for this purpose are justified by the monetary or non-monetary effects attributable thereto. Such measures are in-kind whenever possible and are provided adjacent to or as near as practicable to the area where the damages occur.

Plan A1 was formulated to prevent damages to wildlife resources through good planning. Mitigation is designed to offset unavoidable damages. The destruction of the 74 acres of bottomland hardwoods is not unavoidable. We believe it is better to avoid damaging the 74 acres of bottomland hardwoods than to allow these acres to be destroyed and purchase and preserve lands elsewhere which may or may not be destroyed in the future. The recommended plan will definitely result in the preservation of 74 acres of hardwoods, while the Institute's plan will result in a net loss of 74 acres. Because the Corps will have direct responsibility for the implementation of plan A1, we can insure that bottomland hardwoods are preserved.

If the Corps were to mitigate, the mitigation would have to be in-kind. The 74 acres of bottomland hardwoods destroyed would be mitigated by the purchase of the same number of acres. The difference in costs between plans A and A1 cannot be used as justification for buying additional acreage. These costs are only estimated costs; they will not be finalized until the construction contract is awarded.

APPENDIX C

DIVISION OF PLAN AND CONSTRUCTION

RECEIVED [illegible]

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APPENDIX G

DIVISION OF PLAN RESPONSIBILITIES

The purpose of this section is to present the division of plan responsibilities between Federal and non-Federal interests in connection with the development of the proposed project and documentation of the intent of non-Federal interests to fulfill their responsibilities.

FEDERAL RESPONSIBILITIES

Upon congressional authorization and funding, the United States will prepare detailed designs and plans. Upon receipt of assurances from non-Federal interests that they will fulfill their responsibilities for the project, the United States will construct the levees, borrow pits, and drainage structures to project specifications.

NON-FEDERAL RESPONSIBILITIES

Prior to the commencement of the construction of the recommended project, non-Federal interests will agree to comply with the following requirements of the Flood Control Act of 1928:

a. Maintain all flood control works after the completion, except controlling and regulating spillway structures, including special relief levees; maintenance normally includes such matters as cutting grass, removal of weeds, local drainage, and minor repairs of main river levees.

b. Agree to accept land turned over to them under provision of Section 4.

c. Provide without cost to the United States, all rights-of-way for levee foundations and levees.

LETTER OF INTENT

A letter of intent from local sponsors was requested by the New Orleans District in a letter dated 23 December 1981. The Louisiana Department of Corrections, by letter dated 28 December 1981, agreed to comply with the above requirements if a Federal project is authorized. These documents are presented on the following pages.



DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P. O. BOX 60267
NEW ORLEANS, LOUISIANA 70160

IN REPLY REFER TO
LMNPD-F

23 December 1981

Mr. Archie D. Parker
Department of Corrections
P.O. Box 44304
Baton Rouge, LA 70804

Dear Mr. Parker:

This is in reference to your telephone conversation with Ms. Lynn Devaul of this office on 16 December 1981 concerning the letter of intent for the Angola levee study. As she told you, the US Army Corps of Engineers is in the process of revising its cost-sharing policies. This has necessitated some revisions to the items of local cooperation specified in the letter of intent. The letter of intent should indicate your acceptance and support for the Louisiana State Penitentiary project and your willingness to financially participate to some level at least consistent with traditional requirements and general laws and policies.

The traditional requirements for local cooperation are specified in Section 3 of the Flood Control Act of 15 May 1928 and are as follows:

a. Maintain all flood control works after their completion, except controlling and regulating spillway structures, including special relief levees; maintenance includes normally such matters as cutting grass, removal of weeds, local drainage, and minor repairs of main river levees;

b. Agree to accept land turned over to them under provision of Section 4; and

c. Provide without cost to the United States, all rights-of-way for levee foundations and levees.

A copy of Sections 1 through 4 of the Flood Control Act of 1928 is inclosed for your information.

LMNPD-F

23 December 1981

Mr. Archie D. Parker

We would like to receive the revised letter of intent as soon as possible so that we may submit the final report. If you have any questions, please call Ms. Lynn Devaul at 838-2506.

Sincerely,

1 Incl
As stated

R. H. SCHROEDER, JR.
Acting Chief, Planning Division



DAVID C. TREEN
GOVERNOR

LOUISIANA DEPARTMENT OF CORRECTIONS
OFFICE OF ADULT SERVICES
P.O. BOX 44304 CAPITOL STATION
BATON ROUGE, LOUISIANA 70804

December 28, 1981

JOHN T. KING
SECRETARY OF
CORRECTIONS

A.D. PARKER
ASST. SECRETARY
TELEPHONE 342-6646

Mr. R. H. Schroeder, Jr.
Acting Chief, Planning Division
Department of the Army
New Orleans District, Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Mr. Schroeder:

This letter of intent is to indicate the acceptance and support by the Louisiana Department of Corrections for the Louisiana State Penitentiary Project. The Louisiana Department of Corrections also hereby indicates its willingness to financially participate, subject to the approval of the Louisiana Legislature, at a level consistent with the traditional requirements and general laws and policies.

As indicated in your letter of December 23, 1981, it is our understanding that the traditional requirements for local cooperation as specified in Section 3 of the Flood Control Act of 15 May 1928 are as follows:

a. Maintain all flood control works after their completion, except controlling and regulating spillway structures, including special relief levees; maintenance includes normally such matters as cutting grass, removal of weeds, local drainage, and minor repairs of main river levees;

b. Agree to accept land turned over to them under provision of Section 4; and

c. Provide without cost to the United States, all rights-of-ways for levee foundations and levees.

Page 2

Your enclosure of Section 1 through 4 of the Flood Control Act of 1928 is appreciated. Please telephone me at (504) 342-6647 should you require anything additional.

Sincerely,



A. D. Parker
Assistant Secretary/Adults

ADP:bm

cc Mr. John T. King
Secretary of Corrections

Mr. Mike Martin
Undersecretary

Ross Maggio, Warden
La. State Penitentiary

Ms. Martha Morgan
Attorney for Corrections

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